Contents
Using the Diagnostic and Placement Tests
Placement Options
When to Use the Placement Tests
Interpreting Scores
Scoring Guide Masters
Using Placement Tests for Diagnostic Purposes
Learning Objectives Masters
Answer Keys

Diagnostic and Placement Tests for Grades K through 8, Algebra 1, Geometry, and Algebra 2

- Scoring Guide
  simplify placement decisions

- Diagnostic Chart
  suggestions for intervention and remediation

- Intervention/Remediation
  suggested materials

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## Table of Contents

### Introduction
- Using McGraw-Hill’s Diagnostic and Placement Tests  iv  
- Placement Options  v  
- When to Use the Diagnostic and Placement Tests  vi  
- Interpreting Scores  vii  
- Using Placement Tests for Diagnostic Purposes  ix  

### Grade Level Objectives and Scoring

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade K</td>
<td>1</td>
</tr>
<tr>
<td>Grade 1</td>
<td>9</td>
</tr>
<tr>
<td>Grade 2</td>
<td>19</td>
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<td>Grade 3</td>
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<td>41</td>
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<td>Grade 7</td>
<td>86</td>
</tr>
<tr>
<td>Grade 8</td>
<td>99</td>
</tr>
<tr>
<td>Algebra 1</td>
<td>114</td>
</tr>
<tr>
<td>Geometry</td>
<td>129</td>
</tr>
<tr>
<td>Algebra 2</td>
<td>144</td>
</tr>
</tbody>
</table>

### Diagnostic and Placement Tests

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade K</td>
<td>5</td>
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<tr>
<td>Grade 1</td>
<td>13</td>
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<td>Grade 2</td>
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<tr>
<td>Grade 3</td>
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<tr>
<td>Grade 4</td>
<td>47</td>
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<tr>
<td>Grade 5</td>
<td>63</td>
</tr>
<tr>
<td>Grade 6</td>
<td>80</td>
</tr>
<tr>
<td>Grade 7</td>
<td>93</td>
</tr>
<tr>
<td>Grade 8</td>
<td>106</td>
</tr>
<tr>
<td>Algebra 1</td>
<td>121</td>
</tr>
<tr>
<td>Geometry</td>
<td>136</td>
</tr>
<tr>
<td>Algebra 2</td>
<td>151</td>
</tr>
</tbody>
</table>

### Answer Keys

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade K</td>
<td>161</td>
</tr>
<tr>
<td>Grade 1</td>
<td>163</td>
</tr>
<tr>
<td>Grade 2</td>
<td>165</td>
</tr>
<tr>
<td>Grade 3</td>
<td>168</td>
</tr>
<tr>
<td>Grade 4</td>
<td>172</td>
</tr>
<tr>
<td>Grade 5</td>
<td>177</td>
</tr>
<tr>
<td>Grade 6</td>
<td>182</td>
</tr>
<tr>
<td>Grade 7</td>
<td>185</td>
</tr>
<tr>
<td>Grade 8</td>
<td>188</td>
</tr>
<tr>
<td>Algebra 1</td>
<td>192</td>
</tr>
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<td>200</td>
</tr>
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This booklet is designed to be used in two ways.

- The twelve tests in this booklet provide tools to assist teachers in making placement decisions with the McGraw-Hill Mathematics series for Kindergarten through Algebra 2:
  - *My Math, Grade K*
  - *My Math, Grade 1*
  - *My Math, Grade 2*
  - *My Math, Grade 3*
  - *My Math, Grade 4*
  - *My Math, Grade 5*
  - *Glencoe Math, Course 1*
  - *Glencoe Math, Course 2*
  - *Glencoe Math, Course 3*
  - *Math Triumphs, Grades K–8*
  - *Glencoe Pre-Algebra*
  - *Glencoe Algebra 1*
  - *Glencoe Geometry*
  - *Glencoe Algebra 2*

- These tests provide valuable diagnostic information teachers may find helpful throughout the school year. See Learning Objectives before each test in this booklet for further information on using these tests as diagnostic tools.

- These tests are also available in Spanish.
Placement Options

Placement Decisions

In making placement decisions for a student, consider a variety of evidence, such as the student’s mathematics grades, classroom observations, teacher recommendations, portfolios of student work, standardized test scores, and placement test scores. Use the results of these placement tests in conjunction with other assessments to determine which mathematics course best fits a student’s abilities and needs.

These tests can help determine whether or not students need intervention as well as the level of intervention required. Through strategic intervention, teachers can work with students using on-level content, but strategically choose which domain(s) need further development. Sometimes, a student may struggle with a particular domain, but overall the student is able to perform on-level.

Intensive intervention is used with students who are struggling with most or all domains of math content and are unable to work on grade-level. These students will need alternative intervention materials to help meet their needs. These materials, such as the Math Triumphs programs, offer alternatives that will accelerate achievement in mathematics.

Test Content

These placement tests measure ability, but they are not achievement tests. They cover prerequisite concepts, not every concept found in a McGraw-Hill mathematics textbook, the Common Core State Standards, or in your state standards.

Mathematics concepts are introduced, developed, and reinforced in consecutive courses. These placement tests measure student mastery of concepts and skills that have been introduced or developed in the student’s current or previous mathematics course, that are further developed in the next course, but that are not developed in the following course.
When to Use the Diagnostic and Placement Tests

In most situations, these placement tests are given near the end of the current course, in order to help determine student placement for the following year. You can also use these tests in special situations, such as a student transferring into your school mid-year or entering middle school with advanced mathematics ability.

Placement Tests Format

Placement Tests for Kindergarten through Grade 2 use a similar format. They each contain 15 questions. The Kindergarten and Grade 1 tests require students to follow simple directions in order to answer each question, while the Grade 2 test is multiple-choice. The Kindergarten test addresses the domains: Counting & Cardinality, Operations & Algebraic Thinking, Number & Operations in Base Ten, Measurement & Data, and Geometry. The Grade 1 and Grade 2 tests address the domains: Operations & Algebraic Thinking, Number & Operations in Base Ten, Measurement & Data, and Geometry.

Placement Tests for Grades 3 through Algebra 1 use a similar format. They each contain 30 multiple-choice questions. The Grade 3, Grade 4, and Grade 5 tests address the domains: Operations & Algebraic Thinking, Number & Operations in Base Ten, Number & Operations—Fractions, Measurement & Data, and Geometry. The Grade 6 and Grade 7 tests address the domains: Ratios & Proportional Relationships, The Number System, Expressions & Equations, Geometry, and Statistics & Probability. The Grade 8 and Algebra 1 tests address the domains: The Number System, Expressions & Equations, Functions, Geometry, and Statistics & Probability.

The placement tests for Geometry and Algebra 2 also contain 30 multiple-choice questions. However, the Geometry test covers the Algebra 1 domains, including: Interpreting Functions, Reasoning with Equations and Inequalities, Linear, Quadratic, and Exponential Models, Seeing Structure In Expressions, Creating Equations. The Real Number System, and Interpreting Categorical and Quantitative Data.

The Algebra 2 test focuses on domains for Geometry as well as prerequisite skills found in the Algebra 1 domains. The domains covered in the Algebra 2 placement test include: Creating Equations, Seeing Structures in Expressions, Interpreting Functions, Reasoning with Equations and Inequalities, Similarity, Right Triangles, and Trigonometry, Geometric Measurement and Dimension, Modeling with Geometry, Expressing Geometric Properties with Equations, Circles, and Congruence.
Interpreting Scores

When interpreting scores on the placement tests, consider the student’s score on each part, as well as the total score. Scoring Guide Masters before each test can be reproduced and used to record each student’s score. A sample of a completed Scoring Guide for Grade 5 is shown below; a sample for Algebra 1 is provided on the next page.

The shaded boxes show the range of scores that corresponds to each placement option. If a student’s scores on each part of the test fall in the same shaded range, then that course is probably the best placement decision. If a student’s scores fall in different ranges or near range boundaries, then analyze the results for each part and use additional assessment results to help determine placement.

Sample Score and Placement Analysis

On the Grade 5 test, this student scored 2 out of 6 questions correct in Number and Operations in Base Ten, 5 in Number and Operations–Fractions, 7 in Operations and Algebraic Thinking, 4 in Measurement and Data, 2 in Geometry. The total number correct was 20 out of 30.

**Note:** There is not a direct correlation between the score for each strand and the total test score. Use the total score for class placement decisions, and the scores by strand when working on particular objectives.

Sample Analysis

This student scored well in the first two parts of the test, but lower in the remaining sections. If these results are similar to other assessments, this student is likely to need intervention materials for Grade 5, but will likely find Grade 5 too challenging without any intervention materials. The teacher should also note that the student scored particularly low in the Number and Operations in Base Ten. This student may require intensive intervention when these skills are taught.
Scoring Placement Test for Algebra 1

Students who score in the Algebra 1 range for each of the four parts are ready for Algebra 1. Students who score in the Pre-Algebra range or below in each of the four parts, are best served by Pre-Algebra.

To place students who score in the Algebra 1 range on only two or three parts, use other factors, such as previous mathematics grades and teacher recommendations.

Sample Score and Placement Analysis

On the Algebra 1 test, this student scored 6 out of 7 questions correct in Expressions and Equations, 5 in The Number System, 2 in Functions, 5 in Geometry, and 3 in Statistics and Probability. The total number correct was 21 out of 30.

Sample Analysis

This student could be placed in either algebra course. This student will likely do well in Pre-Algebra, but may find Algebra 1 challenging. This student may need additional help to succeed in Algebra 1 since some sections show relatively low scores. Check which questions were missed and consider other factors, such as English language or reading difficulties.
Using Placement Tests for Diagnostic Purposes

These placement tests also provide valuable diagnostic information for classroom teachers. Reproducible learning objective charts list the learning objective for each test question and can be found before each test. By marking each question the student answered incorrectly, you can see which objectives the student has not mastered.

McGraw-Hill's wide variety of supplementary materials, such as Reteach, Skill Practice, Homework Practice, and Problem Solving Practice worksheets available online at connectEd.mcgraw-hill.com, and the ExamView® Assessment Suite CD-ROM, can provide intervention and remedial help. Diagnostic charts for each test, found with the learning objectives pages, describe the intervention that students may require and include a list of McGraw-Hill print and technology materials.

If these tests are given near the end of the student’s current course, it is recommended that the diagnostic information be shared with the teacher of that student’s next course, in order to provide appropriate intervention during the next year.
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade K, Strategic Intervention—See page 4 for materials list.
- My Math, Kindergarten
Student Name ____________________________

In the column on the left, mark the questions that the student answered *incorrectly*.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counting and Cardinality</td>
<td>1</td>
<td>Represent a number of objects with a written numeral 0–20.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Understand the relationship between numbers and quantities.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.</td>
</tr>
<tr>
<td>Operations and Algebraic Thinking</td>
<td>4</td>
<td>Represent addition and subtraction with objects.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>For any number from 1 to 9, find the number that makes 10 when added to the given number.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Solve addition and subtraction word problems.</td>
</tr>
<tr>
<td>Number and Operations in Base Ten</td>
<td>7</td>
<td>Compose and decompose numbers from 11 to 19 into ten ones and some further ones.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Compose and decompose numbers from 11 to 19 into ten ones and some further ones.</td>
</tr>
<tr>
<td>Measurement and Data</td>
<td>9</td>
<td>Compare two objects with a measurable attribute in common.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Compare two objects with a measurable attribute in common.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.</td>
</tr>
<tr>
<td>Geometry</td>
<td>13</td>
<td>Analyze and compare two- and three-dimensional shapes.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Describe the relative positions of objects using terms such as <em>above</em>, <em>below</em>, <em>beside</em>, <em>in front of</em>, <em>behind</em>, and <em>next to</em>.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Describe the relative positions of objects using terms such as <em>above</em>, <em>below</em>, <em>beside</em>, <em>in front of</em>, <em>behind</em>, and <em>next to</em>.</td>
</tr>
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### A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intensive Intervention</strong></td>
<td>0–5</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are significantly below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td><strong>Strategic Intervention</strong></td>
<td>6–11</td>
<td>Use additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>My Math</em> program, while receiving the differentiated instruction that they need. Teaching Tips and other resources may also be listed in the Teacher Edition.</td>
</tr>
<tr>
<td><strong>Kindergarten</strong></td>
<td>12 or more</td>
<td>Use <em>My Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 2 or more questions in the Geometry section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>
Find these materials at www.connectED.mcgraw-hill.com.

<table>
<thead>
<tr>
<th>Reteach Masters</th>
<th>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</th>
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<td>Self-Check Quizzes</td>
<td>Students can check their understanding for each lesson and email their results to the teacher</td>
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<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition.</td>
</tr>
<tr>
<td>Math Songs</td>
<td>Collections of songs, raps, and chants</td>
</tr>
</tbody>
</table>

**Additional Technology**

| ExamView® Assessment Suite | Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records |

Diagnostic and Placement
Grade K

This test contains 15 questions. Work each problem in the space on this page. Select the best answer. Write the answer as directed.

1 Count the apples. Write the number. ________

2 Put an X on the set of four cherries.

3 Look at the animals below. Circle the animal that is shown more.

4 Circle the problem that fits the story.

\[
\begin{array}{ccc}
\text{bees} & + & \text{bees} \\
2 & - & 1 \\
1 & + & 2 \\
& & 3
\end{array}
\]
5 How many more squares do you need to have ten squares in all?

6 Milla has 2 apples. Sam has 3 apples. How many apples do they have together?

7 What number is shown below?

8 Circle the cubes below that show how to make 12.

9 Circle the shorter object.

10 Circle the object that holds more.
11 Sort the crayons by color. Use tally marks to show how many crayons are in each group.

<table>
<thead>
<tr>
<th>Number of Crayons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crayons</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

12 Look at the group. Write how many of each pet.

Our Favorite Pets

<table>
<thead>
<tr>
<th></th>
<th>Cat</th>
<th>Dog</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13 Put an X on the objects that can stack.

14 Put an X on the sailboat that is in the middle.

15 Put an X on the crayon that is under the table.
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 1 Strategic Intervention—See page 12 for materials list.
- My Math, Grade 1
**Student Name __________________________**

In the column on the left, mark the questions that the student answered *incorrectly.*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number and Operations in Base Ten</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 1</td>
<td></td>
<td>Compare two two-digit numbers based on meanings of the tens and ones digits.</td>
</tr>
<tr>
<td>□ 2</td>
<td></td>
<td>Count to 120, starting at any number less than 120.</td>
</tr>
<tr>
<td>□ 3</td>
<td></td>
<td>Count to 120, starting at any number less than 120.</td>
</tr>
<tr>
<td>□ 4</td>
<td></td>
<td>Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols &gt;, =, and &lt;.</td>
</tr>
<tr>
<td>□ 5</td>
<td></td>
<td>Understand that the two digits of a two-digit number represent amounts of tens and ones.</td>
</tr>
<tr>
<td><strong>Operations and Algebraic Thinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 6</td>
<td></td>
<td>Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.</td>
</tr>
<tr>
<td>□ 7</td>
<td></td>
<td>Apply properties of operations as strategies to add and subtract.</td>
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<tr>
<td>□ 8</td>
<td></td>
<td>Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.</td>
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<td><strong>Geometry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 9</td>
<td></td>
<td>Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters.</td>
</tr>
<tr>
<td>□ 10</td>
<td></td>
<td>Build and draw shapes to possess defining attributes.</td>
</tr>
<tr>
<td>□ 11</td>
<td></td>
<td>Build and draw shapes to possess defining attributes.</td>
</tr>
<tr>
<td>□ 12</td>
<td></td>
<td>Compose two-dimensional shapes or three-dimensional shapes to create a composite shape.</td>
</tr>
<tr>
<td><strong>Measurement and Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 13</td>
<td></td>
<td>Compare the lengths of two objects indirectly by using a third object.</td>
</tr>
<tr>
<td>□ 14</td>
<td></td>
<td>Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</td>
</tr>
<tr>
<td>□ 15</td>
<td></td>
<td>Order three objects by length.</td>
</tr>
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</table>
### Student Performance Level

<table>
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<tr>
<td>Strategic Intervention Guide</td>
<td>Additional assessment with follow-up suggestions and activities for remediation.</td>
</tr>
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</table>

**Additional Technology**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
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<td>ExamView® Assessment Suite</td>
<td>Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records.</td>
</tr>
</tbody>
</table>
Diagnostic and Placement Grade 1

This test contains 15 questions. Work each problem in the space on this page. Select the best answer. Circle the correct answer.

1. The number of hearts is _______ the number of triangles.

![Heart and Triangle Patterns]

more than
less than
equal to

2. How many diamonds?

![Diamond Patterns]

16  17  18  19

3. What number comes after 39?

37  38  40  41
4. Which sign makes the number sentence $43 \bigcirc 43$ true?

   $=$  $+$  $-$  $?$

5. What number is modeled below?

   10  27  23  37

6. Write a number sentence that shows how many hats Maria bought in all.

   ____
What number makes the number sentence true?

3 + 6 = \_

3  4  5  6

Circle the number sentence that is true.

7 = 3 + 5  8 = 2 + 6

Which picture shows a cookie split into 2 equal parts?

Which set of words best describes the shape?

- triangle, 3 sides
- square, 4 equal sides
- rectangle, 4 sides
- circle, 0 sides
11 Circle the shape that has 4 equal sides.

12 The triangles below can be combined to form which shape?

13 Circle the longer object.
14 Look at the group. Write how many of each pet.

Our Favorite Pets

<table>
<thead>
<tr>
<th>Pet</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15 List the items from longest to shortest.

- crayon, pencil, marker
- pencil, marker, crayon
- marker, pencil, crayon
- crayon, marker, pencil
For each part, mark the box under the number of correctly answered questions.

Number and Operations in Base Ten

Operations and Algebraic Thinking

Measurement and Data

Geometry

Mark the total number correct below.

Total

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Key: Consider this student for...

- Math Triumphs
- Grade 2 Strategic Intervention—See page 21 for materials list.
- My Math, Grade 2
### Domain | Question Number | Objective |
--- | --- | --- |
**Number and Operations in Base Ten** | | |
- | 1 | Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons. |
- | 2 | Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. |
- | 3 | Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. |
**Operations and Algebraic Thinking** | | |
- | 4 | Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions. |
- | 5 | Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions. |
- | 6 | Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. |
**Geometry** | | |
- | 7 | Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. |
- | 8 | Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. |
- | 9 | Estimate lengths using units of inches, feet, centimeters, and meters. |
- | 10 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. |
- | 11 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. |
**Measurement and Data** | | |
- | 12 | Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. |
- | 13 | Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. |
- | 14 | Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. |
- | 15 | Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc. |
### Diagnostic Chart

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intensive Intervention</strong></td>
<td>0–5</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td><strong>Strategic Intervention</strong></td>
<td>6–11</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>My Math</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Grade 2</td>
<td>12 or more</td>
<td>Use <em>My Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 1 or more questions in the Measurement and Data section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>

### A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students' scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.
Find these materials at www.connectED.mcgraw-hill.com.

<table>
<thead>
<tr>
<th>Re-teach Masters</th>
<th>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Students can check their understanding for each lesson and email their results to the teacher</td>
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<tr>
<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition.</td>
</tr>
<tr>
<td>Math Songs</td>
<td>Collections of songs, raps, and chants</td>
</tr>
<tr>
<td>Strategic Intervention Guide</td>
<td>Additional assessment with follow-up suggestions and activities for remediation</td>
</tr>
</tbody>
</table>

**Additional Technology**

| ExamView® Assessment Suite | Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records |

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Copyright © The McGraw-Hill Companies, Inc. Permission is granted to reproduce for classroom use.
This test contains 15 questions. Work each problem in the space on this page. Circle the best answer.

1. Which sign makes the number sentence $245 \circ 268$ true?
   \[ = \quad > \quad < \quad + \]

2. Which number sentence is true?
   \[
   \begin{align*}
   325 + 100 &= 525 \\
   325 - 10 &= 315 \\
   325 - 100 &= 305 \\
   325 + 10 &= 345
   \end{align*}
   \]

3. A number has three ones, two tens, and seven hundreds. What is the number?
   \[
   \begin{align*}
   275 & \quad 723 \\
   725 & \quad 732
   \end{align*}
   \]
4. Ruthie cut 8 triangles and 5 squares out of construction paper. Which number sentence tells how many more triangles than squares Ruthie cut?

\[ 8 - 5 = 3 \]
\[ 8 - 3 = 5 \]
\[ 5 - 8 = 3 \]
\[ 5 + 8 = 13 \]

5. The second grade students ate 8 pizzas. The first grade students ate 6 pizzas. Which number sentence tells how many pizzas they ate in all?

\[ 8 + 6 = 14 \]
\[ 4 + 3 = 7 \]
\[ 8 - 6 = 2 \]
\[ 4 - 3 = 1 \]

6. Circle the number sentence that shows how many hearts in all.

\[ 5 + 5 = 10 \]
\[ 4 + 4 = 8 \]
\[ 2 + 2 + 2 + 2 = 8 \]
\[ 2 + 2 + 2 + 2 + 2 + 2 + 2 = 12 \]
7. What time is shown on the clock?

2:30  3:30  6:15  7:15

8. Mykia has 2 dimes, 3 nickels and 4 pennies. How much money does she have?

$0.39  $0.34  $0.29  $0.24

9. Estimate the length of the crayon in inches. About how long is the crayon?

5 inches  3 inches
4 inches  2 inches
10 Tanya and Marcell asked their friends which pet is their favorite. The results are shown below.

<table>
<thead>
<tr>
<th>Our Favorite Pets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
</tr>
<tr>
<td>Dog</td>
</tr>
<tr>
<td>Bird</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many more chose dogs than cats?

1

2

3

4

11 The class voted on their favorite fruits. The results are shown below. How many more students chose bananas than apples?

<table>
<thead>
<tr>
<th>Favorite Fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
</tr>
<tr>
<td>Bananas</td>
</tr>
<tr>
<td>Apples</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bananas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apples</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1

2

3

4
12 Which object has two faces that are triangles?

- Cylinder
- Hexagonal prism
- Trapezoid
- Octagonal prism

13 Which solid figure has a face that is a circle?

- Cube
- Triangular prism
- Cylinder
- Tetrahedron

14 How many more sides does a pentagon have than a triangle?

- 3
- 2
- 4
- 5

15 Isaiah, Carson, and Julia cut a pizza into three equal sections. Each one of them ate one section of the pizza. How much of the pizza did each one eat?

- a half
- a third
- a fourth
- a whole
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 3 Strategic Intervention—See page 31 for materials list.
- My Math, Grade 3
# Diagnostic and Placement Tests

## Student Name ________________________

In the column on the left, mark the questions that the student answered incorrectly.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number and Operations in Base Ten</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Use place value understanding to round whole numbers to the nearest 10 or 100.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.</td>
</tr>
<tr>
<td>Number and Operations–Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Understand a fraction ( \frac{1}{b} ) as the quantity formed by 1 part when a whole is partitioned into ( b ) equal parts.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Understand a fraction as a number on the number line</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Understand a fraction ( \frac{a}{b} ) as the quantity formed by ( a ) parts of size ( \frac{1}{b} ).</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Understand a fraction ( \frac{a}{b} ) as the quantity formed by ( a ) parts of size ( \frac{1}{b} ).</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</td>
</tr>
<tr>
<td>Operations and Algebraic Thinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Interpret products of whole numbers.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Interpret products of whole numbers.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Interpret whole-number quotients of whole numbers.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Interpret whole-number quotients of whole numbers.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Understand division as an unknown-factor problem.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Measurement and Data</td>
<td>19</td>
<td>Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Measure areas by counting unit squares.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Measure areas by counting unit squares.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Solve word problems involving addition and subtraction of time intervals in minutes.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths.</td>
</tr>
<tr>
<td>Geometry</td>
<td>27</td>
<td>Partition shapes into parts with equal areas.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Understand that shapes in different categories may share attributes, and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Understand that shapes in different categories may share attributes, and that the shared attributes can define a larger category.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.</td>
</tr>
</tbody>
</table>
A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

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<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
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<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>My Math</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
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<td>Grade 3</td>
<td>24 or more</td>
<td>Use <em>My Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 2 or more questions in the Measurement and Data section may require extra assistance as you cover these skills throughout the year.</td>
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<tr>
<td>Personal Tutor</td>
<td>Online instructions for step-by-step solutions for the examples of each lesson in the student textbook</td>
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<tr>
<td>Math Songs</td>
<td>Collections of songs, raps, and chants</td>
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<tr>
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<td>Additional assessment with follow-up suggestions and activities for remediation</td>
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**Additional Technology**

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Diagnostic and Placement
Grade 3

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Round the number shown below to the nearest 10.

   A 50   B 60   C 70   D 80

2. Find the sum of 1,245 and 2,360.
   F 2,505   G 3,505   H 3,595   J 3,605

3. TaLeah and two of her friends each have 20 stretchy bracelets. How many bracelets do they have in all?
   A 40   B 60   C 80   D 90

4. Which number sentences is true?
   F $4 \times 20 = 60$   H $8 \times 20 = 100$
   G $4 \times 30 = 90$   J $5 \times 30 = 150$
5 Each student has 8 marbles. Who has the greatest fraction of black marbles?

A Pilar  
B Bob  
C Cathy  
D Donte

6 Which pizza is more than half eaten?

F  
G  
H  
J

7 What number is located at Point A on the number line below?

A $\frac{1}{4}$  
B $\frac{1}{3}$  
C $\frac{1}{2}$  
D $\frac{2}{3}$
8. What fraction of the students chose apples as their favorite fruit?

<table>
<thead>
<tr>
<th>Favorite Fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
</tr>
<tr>
<td>Bananas</td>
</tr>
<tr>
<td>Apples</td>
</tr>
<tr>
<td>1   2   3   4   5   6   7   8</td>
</tr>
</tbody>
</table>

F \( \frac{4}{17} \) \quad G \( \frac{6}{17} \) \quad H \( \frac{7}{17} \) \quad J \( \frac{1}{2} \)

9. Julia places 3 yellow, 4 red, 1 green, and 2 purple candies in a bag. What candy color are \( \frac{1}{10} \) of the candies?

   A yellow \quad B purple \quad C red \quad D green

10. Which fraction is equivalent to \( \frac{2}{5} \)?

   F \( \frac{1}{3} \) \quad G \( \frac{4}{10} \) \quad H \( \frac{4}{7} \) \quad J \( \frac{6}{10} \)

11. Ms. Anna gave each of her 5 dance students 6 stickers at the end of dance class. Which can be used to find how many stickers she passed out in all?

   A \( 5 \times 6 \) \quad B \( 5 + 6 \) \quad C \( 6 - 5 \) \quad D \( 7 \times 5 \)

12. Sam, Liana, Frank, and Terrell went fishing. Each person caught four fish. How many fish were caught all together?

   F 8 \quad G 4 \quad H 12 \quad J 16
13 A teacher had 20 pieces of chalk. He wanted to give each of his 5 students the same number of pieces. How many pieces of chalk should he give each student?

A 5  B 6  C 4  D 2

14 Fumiko has 35 soccer cards to pass out. He splits them equally among 5 friends. Which number sentence shows how many soccer cards he gave each friend?

F \(35 \div 5 = 7\)
G \(35 - 5 = 30\)
H \(35 \div 6 = 5\)
J \(35 - 10 = 25\)

15 What is the missing number?

30, 32, 34, __, 38, 40, 42

A 33  B 35  C 36  D 37

16 Which of these can be used to check the answer to the problem below?

\[40 \div 5 = 8\]

F \(4 \times 10 = 40\)
G \(2 \times 20 = 40\)
H \(10 + 10 + 20 = 40\)
J \(5 \times 8 = 40\)
17. Look at the pattern in the table.

<table>
<thead>
<tr>
<th>Starfish</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>?</td>
</tr>
</tbody>
</table>

How many points do 4 starfish have?

A 16   B 20   C 25   D 30

18. Onatah noticed wagons have 4 wheels. Which table could she use to determine the number of wheels on four of these wagons?

F

<table>
<thead>
<tr>
<th>Wagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

G

<table>
<thead>
<tr>
<th>Wagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

H

<table>
<thead>
<tr>
<th>Wagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

J

<table>
<thead>
<tr>
<th>Wagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>32</td>
</tr>
</tbody>
</table>

19. How many more CDs does Charles have than Stan?

A 3   B 5   C 30   D 20
20 Look at the clocks. How long does the ballet class last?

F a half hour
G an hour
H an hour and a half
J two hours

21 Each apple weighs 6 ounces. How many 1-ounce weights need to be added to the scale to make it balanced?

A

B

C

D
22 Estimate the length of the crayon to the nearest half inch.

F 1 1/2 inches  G 2 1/2 inches  H 3 1/2 inches  J 4 1/2 inches

23 Find the area of the rectangle.

A 8 square units  C 10 square units
B 9 square units  D 12 square units

24 A rectangle has one side that measures 6 feet and the other side measures 4 feet. Which of these cannot be used to find the area of the rectangle?

F 6 + 6 + 6 + 6
G 4 × 6
H 6 × 4
J 6 + 4

25 Franco got home from school at 3:40. Fifteen minutes later he went outside to play. What time did he go outside to play?

A 3:45  B 3:50  C 3:55  D 4:00
26 Find the perimeter of the rectangle.

F 6 units  G 8 units  H 10 units  J 12 units

27 Look at the two triangles. Which of the following shapes could be made from the two triangles?

A   B   C   D

28 What statement is true about the two figures?

F Both figures are rectangles.
G Both figures are quadrilaterals.
H Both figures have the same area.
J Both figures are the same.

29 Which of the following shapes does not have four sides?

A square   B rectangle   C rhombus   D triangle

30 Sophie cut an orange into four equal sections. She ate one of the sections. How much of the orange did she eat?

F $\frac{1}{4}$  G $\frac{1}{3}$  H $\frac{1}{2}$  J $\frac{3}{4}$
For each part, mark the box under the number of correctly answered questions.

Number and Operations in Base Ten

Number and Operations-Fractions

Operations and Algebraic Thinking

Measurement and Data

Geometry

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 4 Strategic Intervention—See page 45 for materials list.
- My Math, Grade 4
# Student Name ________________

In the column on the left, mark the questions that the student answered *incorrectly*.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number and Operations in Base Ten</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Compare two multi-digit numbers based on meanings of the digits in each place, using $&gt;$, $=$, and $&lt;$ symbols to record the results of comparisons.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Use place value understanding to round multi-digit whole numbers to any place.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Multiply a whole number of up to four digits by a one-digit whole number using strategies based on place value and the properties of operations.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Compare two multi-digit numbers based on meanings of the digits in each place, using $&gt;$, $=$, and $&lt;$ symbols to record the results of comparisons.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.</td>
</tr>
<tr>
<td><strong>Number and Operations – Fractions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Compare two fractions with different numerators and different denominators.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Compare two decimals to hundredths by reasoning about their size.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Use decimal notation for fractions with denominators 10 or 100.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$.</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Operations and Algebraic Thinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Represent verbal statements of multiplicative comparisons as multiplication equations.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Generate a number or shape pattern that follows a given rule.</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Generate a number or shape pattern that follows a given rule.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Find all factor pairs for a whole number in the range 1–100.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Generate a number or shape pattern that follows a given rule.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Generate a number or shape pattern that follows a given rule.</td>
</tr>
<tr>
<td><strong>Measurement and Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Use the four operations to solve word problems involving money.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Know relative sizes of measurement units within one system of units including km, m, cm.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Use the four operations to solve word problems involving intervals of time.</td>
</tr>
<tr>
<td><strong>Geometry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Identify angles (right, acute, obtuse) in two-dimensional figures.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.</td>
</tr>
</tbody>
</table>
### A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students' scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>My Math</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Grade 4</td>
<td>24 or more</td>
<td>Use <em>My Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 2 or more questions in the Measurement and Data section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>
### Find these materials at www.connectED.mcgraw-hill.com.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reteach Masters</td>
<td>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</td>
</tr>
<tr>
<td>Self-Check Quizzes</td>
<td>Students can check their understanding for each lesson and email their results to the teacher</td>
</tr>
<tr>
<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition</td>
</tr>
<tr>
<td>Personal Tutor</td>
<td>Online instructions for step-by-step solutions for the examples of each lesson in the student textbook</td>
</tr>
<tr>
<td>Math Songs</td>
<td>Collections of songs, raps, and chants</td>
</tr>
<tr>
<td>Strategic Intervention Guide</td>
<td>Additional assessment with follow-up suggestions and activities for remediation</td>
</tr>
</tbody>
</table>

### Additional Technology

<table>
<thead>
<tr>
<th>Additional Technology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExamView® Assessment Suite</td>
<td>Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records</td>
</tr>
</tbody>
</table>
### Mathematics Chart

#### LENGTH

<table>
<thead>
<tr>
<th>Metric</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 meter = 100 centimeters</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td>1 year = 12 months</td>
</tr>
</tbody>
</table>

#### Customary

| 1 yard = 3 feet | 1 year = 52 weeks |
| 1 foot = 12 inches | 1 week = 7 days   |

#### Perimeter

<table>
<thead>
<tr>
<th>Perimeter</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>square</td>
<td>$P = 4s$</td>
</tr>
<tr>
<td>rectangle</td>
<td>$P = 2\ell + 2w$ or ( P = 2(\ell + w) )</td>
</tr>
</tbody>
</table>

#### Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>rectangle</td>
<td>$A = \ell w$ or ( A = bh )</td>
</tr>
</tbody>
</table>
Diagnostic and Placement Grade 4

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Which set of numbers is in order from least to greatest?
   A 4324, 4432, 4243, 4234
   B 4432, 4324, 4243, 4234
   C 4243, 4234, 4324, 4432
   D 4234, 4243, 4324, 4432
   \[ \boxed{1} \]

2. To enter a dog show, Tehya must weigh her Great Dane and record his weight rounded to the nearest ten pounds. Tehya’s Great Dane weighs 123 pounds. Which weight should Tehya record for the dog show?
   F 100 pounds
   G 120 pounds
   H 125 pounds
   J 130 pounds
   \[ \boxed{2} \]

3. Find the unknown.
   \[ 458 \times 7 = x \]
   A 465
   B 2,856
   C 3,204
   D 3,206
   \[ \boxed{3} \]
4 Which symbol makes the number sentence 27,543 □ 27,343 true?

F  >  G  <  H  =  J  +

5 Find the unknown.

328 ÷ 6 = y

A  54 R4  C  56
B  54 R2  D  56 R4

6 Marley makes an apple pie and a blueberry pie to serve at Thanksgiving dinner. After dessert, she notices that \( \frac{3}{8} \) of the apple pie remains and \( \frac{1}{4} \) of the blueberry pie remains. Which statement is TRUE concerning Marley’s observation?

F  More apple pie remained than blueberry pie because \( \frac{3}{8} > \frac{1}{4} \).
G  More blueberry pie remained than apple pie because \( \frac{3}{8} > \frac{1}{4} \).
H  More apple pie was eaten than blueberry pie because \( \frac{3}{8} < \frac{1}{4} \).
J  Both pies had the same amount remaining because \( \frac{3}{8} = \frac{1}{4} \).
7 What fraction is not equivalent to the fraction of cows in the group of animals?

- A $\frac{2}{5}$
- B $\frac{4}{10}$
- C $\frac{6}{15}$
- D $\frac{4}{5}$

8 Identify a fraction equivalent to the fraction shown on the number line.

- F $\frac{1}{3}$
- G $\frac{4}{6}$
- H $\frac{3}{4}$
- J $\frac{7}{8}$

9 Which of the following numbers is the greatest?

- A 11.6
- B 2.09
- C 4.63
- D 1.17

10 Which point could represent 1.65?

- F Point P
- G Point Q
- H Point R
- J Point S
11 On Field Day, Camille hopped on one foot around \( \frac{2}{5} \) of the track. Payton hopped on one foot around \( \frac{1}{5} \) of the track. Together, how far did they hop around the track on one foot?

- A \( \frac{1}{5} \)
- B \( \frac{2}{5} \)
- C \( \frac{3}{5} \)
- D \( \frac{4}{5} \)

12 Which of the following number sentences is true about \( \frac{8}{5} \)?

- F \( \frac{1}{8} + \frac{1}{5} = \frac{8}{5} \)
- H \( \frac{1}{5} \times \frac{1}{8} = \frac{8}{5} \)
- G \( 5 \times \frac{1}{8} = \frac{8}{5} \)
- J \( 8 \times \frac{1}{5} = \frac{8}{5} \)

13 Jordan buys twenty-four gumballs at the candy store. On the way home, he chews six gumballs and gives three to his sister. How many gumballs does Jordan have left when he gets home?

- A 13
- B 14
- C 15
- D 16

14 Which signs go in the boxes to make the number sentence true?

\[
42 \phantom{0} 7 \phantom{0} 5 = 11
\]

- F \( \div; + \)
- G \( -; + \)
- H \( \div; \times \)
- J \( -; \times \)
Drew owns 4 sheets of stickers. Each sheet has 12 stickers. Which number sentence does not show how to find the total number of stickers Drew owns?

\[
\begin{align*}
A & \quad 12 + 4 = \blankspace \\
B & \quad 12 + 12 + 12 + 12 = \blankspace \\
C & \quad 12 \times 4 = \blankspace \\
D & \quad 4 \times 12 = \blankspace
\end{align*}
\]

Heather and Matt both collect rocks. Heather says that she has thirty-two rocks in her collection. Matt says that he has three times as many rocks as Heather does. Which number sentence could Heather use to find the number of rocks in Matt’s collection?

\[
\begin{align*}
F & \quad 32 + 3 \\
G & \quad 32 - 3 \\
H & \quad 32 \times 3 \\
J & \quad 32 \div 3
\end{align*}
\]

The table below shows the number of crayons in each box. If every box has the same number of crayons, how many crayons will be in 8 boxes?

<table>
<thead>
<tr>
<th>Number of Boxes</th>
<th>Number of Crayons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
A & \quad 8 \\
B & \quad 32 \\
C & \quad 64 \\
D & \quad 72
\end{align*}
\]
18 A line of ants is moving across Denise’s picnic blanket. She counts 6 legs on the first ant, 12 legs on the first two ants, and 18 legs on the first three ants. If Denise continues to count, how many legs will she count on the first 12 ants?

F 24 legs  G 56 legs  H 60 legs  J 72 legs

19 Which factor pair does not belong to 36?
A 1, 36  C 6, 6
B 2, 12  D 4, 9

20 Hector saves $5.00 of his allowance every week. After 12 weeks he has $60.00 saved. Which table could he use to show the amount of money he will save after 20 weeks?

F  
<table>
<thead>
<tr>
<th>Week</th>
<th>Money Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$65.00</td>
</tr>
<tr>
<td>16</td>
<td>$70.00</td>
</tr>
<tr>
<td>17</td>
<td>$75.00</td>
</tr>
<tr>
<td>18</td>
<td>$80.00</td>
</tr>
<tr>
<td>19</td>
<td>$85.00</td>
</tr>
<tr>
<td>20</td>
<td>$90.00</td>
</tr>
</tbody>
</table>

G  
<table>
<thead>
<tr>
<th>Week</th>
<th>Money Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$70.00</td>
</tr>
<tr>
<td>16</td>
<td>$75.00</td>
</tr>
<tr>
<td>17</td>
<td>$80.00</td>
</tr>
<tr>
<td>18</td>
<td>$85.00</td>
</tr>
<tr>
<td>19</td>
<td>$90.00</td>
</tr>
<tr>
<td>20</td>
<td>$95.00</td>
</tr>
</tbody>
</table>

H  
<table>
<thead>
<tr>
<th>Week</th>
<th>Money Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$75.00</td>
</tr>
<tr>
<td>16</td>
<td>$80.00</td>
</tr>
<tr>
<td>17</td>
<td>$85.00</td>
</tr>
<tr>
<td>18</td>
<td>$90.00</td>
</tr>
<tr>
<td>19</td>
<td>$95.00</td>
</tr>
<tr>
<td>20</td>
<td>$100.00</td>
</tr>
</tbody>
</table>

J  
<table>
<thead>
<tr>
<th>Week</th>
<th>Money Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$80.00</td>
</tr>
<tr>
<td>16</td>
<td>$85.00</td>
</tr>
<tr>
<td>17</td>
<td>$90.00</td>
</tr>
<tr>
<td>18</td>
<td>$95.00</td>
</tr>
<tr>
<td>19</td>
<td>$100.00</td>
</tr>
<tr>
<td>20</td>
<td>$105.00</td>
</tr>
</tbody>
</table>
Bianca is building a tower with wooden blocks. She counts the number of blocks on each level and records it in the chart below.

<table>
<thead>
<tr>
<th>Level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocks</td>
<td>20</td>
<td>16</td>
<td>12</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Which statement describes the number of blocks on each level of her tower?

A. Bianca adds 4 blocks with every level of the tower.
B. Bianca adds 6 blocks with every level of the tower.
C. Bianca subtracts 6 blocks with every level of the tower.
D. Bianca subtracts 4 blocks with every level of the tower.

Kiyoshi has three quarters, five dimes, and one nickel in her piggy bank. Identify Kiyoshi’s total amount of money and the operation used to calculate it.

F. $1.10, addition
G. $1.10, subtraction
H. $1.30, addition
J. $1.30, subtraction
23 Measure the length of the ribbon in centimeters. About how long is the ribbon?

A 8 centimeters          C 10 centimeters
B 9 centimeters          D 11 centimeters

24 A classroom is shaped like a rectangle with a length of 30 feet and a width of 24 feet.

What is the perimeter in feet of the classroom?
F 54 feet        G 84 feet        H 108 feet        J 720 feet

25 What is the area of this figure?

A 4 square units       C 7 square units
B 6 square units       D 8 square units
26 Sam’s baseball practice starts at 3:15. His practice is $1\frac{1}{2}$ hours long. What time does his practice end?

F

H

G

J

27 How many lines of symmetry are there in the figure below?

A 0

B 1

C 5

D 10
28 Look at the four angles marked on the picture of a bicycle.

Which angle appears to be a right angle?

F angle 1  H angle 3
G angle 2  J angle 4

29 The polygon below has two right angles.

Which side of the polygon is parallel to side $\overline{AB}$?

A $\overline{BC}$  C $\overline{DE}$
B $\overline{CD}$  D $\overline{EA}$

30 Bella drew an angle that measured 105°. What type of angle did she draw?

F right  H obtuse
G acute  J straight
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 5 Strategic Intervention—See page 60 for materials list.
- My Math, Grade 5
## Student Name

In the column on the left, mark the questions that the student answered *incorrectly.*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number and Operations in Base Ten</td>
<td>1</td>
<td>Read, write, and compare decimals to thousandths.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Use place value understanding to round decimals to any place.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Read, write, and compare decimals to thousandths.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Use whole-number exponents to denote powers of 10.</td>
</tr>
<tr>
<td>Number and Operations–Fractions</td>
<td>7</td>
<td>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Interpret the product ( \left( \frac{a}{b} \right) \times q ) as a parts of a partition of ( q ) into ( b ) equal parts; equivalently, as the result of a sequence of operations ( a \times q \div b ).</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Operations and Algebraic</td>
<td>13</td>
<td>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td>
</tr>
<tr>
<td>Thinking</td>
<td>14</td>
<td>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms.</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real world problems.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real world problems.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real world problems.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Classify two-dimensional figures in a hierarchy based on properties.</td>
</tr>
</tbody>
</table>
A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>My Math</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Grade 5</td>
<td>24 or more</td>
<td>Use <em>My Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 2 or more questions in the Measurement and Data section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>
### Get ConnectED

Find these materials at [www.connectED.mcgraw-hill.com](http://www.connectED.mcgraw-hill.com).

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reteach Masters</td>
<td>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</td>
</tr>
<tr>
<td>Self-Check Quizzes</td>
<td>Students can check their understanding for each lesson and email their results to the teacher</td>
</tr>
<tr>
<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition.</td>
</tr>
<tr>
<td>Personal Tutor</td>
<td>Online instructions for step-by-step solutions for the examples of each lesson in the student textbook</td>
</tr>
<tr>
<td>Math Songs</td>
<td>Collections of songs, raps, and chants</td>
</tr>
<tr>
<td>Strategic Intervention Guide</td>
<td>Additional assessment with follow-up suggestions and activities for remediation</td>
</tr>
</tbody>
</table>

### Additional Technology

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExamView® Assessment Suite</td>
<td>Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records</td>
</tr>
</tbody>
</table>
### Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CAPACITY AND VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilometer = 1,000 meters</td>
<td>1 liter = 1,000 milliliters</td>
</tr>
<tr>
<td>1 meter = 100 centimeters</td>
<td></td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td></td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 mile = 1,760 yards</td>
<td>1 gallon = 4 quarts</td>
</tr>
<tr>
<td>1 mile = 5,280 feet</td>
<td>1 gallon = 128 ounces</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td></td>
<td>1 cup = 8 ounces</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td></td>
</tr>
<tr>
<td>1 kilogram = 1,000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1,000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 ton = 2,000 pounds</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 day = 24 hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>rectangle $A = \ell w$ or $A = bh$</td>
<td>right rectangular prism $V = \ell \times w \times h$ or $V = B \times h$</td>
</tr>
</tbody>
</table>
Diagnostic and Placement Grade 5

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. What decimal is equivalent to \( \frac{3}{4} \)?

   - A. 0.25
   - B. 0.34
   - C. 0.75
   - D. 1.33

2. Find the product of 6.1 and 4.9.

   - F. 7.93
   - G. 11.0
   - H. 29.89
   - J. 30.79
Look at the table below. Which of the following has NOT been rounded correctly to the nearest hundred?

<table>
<thead>
<tr>
<th>City</th>
<th>Exact Population</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>690,252</td>
<td>690,300</td>
</tr>
<tr>
<td>Chicago</td>
<td>3,844,829</td>
<td>3,844,800</td>
</tr>
<tr>
<td>Seattle</td>
<td>557,087</td>
<td>557,100</td>
</tr>
<tr>
<td>St. Louis</td>
<td>912,332</td>
<td>912,330</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau

A  Chicago  C  Seattle
B  Austin  D  St. Louis

The number 13.76 is read as which of the following:

F  thirteen and seventy-six tenths
G  thirteen and seventy-six hundredths
H  thirteen and seventy-six thousandths
J  thirteen thousand and seventy-six

Raven is asked to check the answer to the multiplication problem below. Which number sentence could she use to check her answer?

\[23 \times 452 = 10,396\]

A  \[23 + 452 = 475\]  C  \[10,396 \times 23 = 452\]
B  \[452 - 23 = 429\]  D  \[10,396 \div 23 = 452\]
6. How can you write 10,000,000 using exponents?

- F: $10^4$
- G: $10^5$
- H: $10^6$
- J: $10^7$

7. Inali ate $\frac{3}{8}$ of a pizza. His friend ate $\frac{1}{4}$ of the pizza. How much did they eat all together.

   - A: $\frac{1}{3}$
   - B: $\frac{1}{2}$
   - C: $\frac{5}{8}$
   - D: $\frac{3}{4}$

8. Josh, Avi, and Charlotte each sold slices of pie at the bake sale. The figures below show how they each cut their pie. The shaded parts represent the pieces they sold. What can you conclude from the data?

   - F: Josh and Avi sold $1\frac{1}{4}$ pies.
   - G: Avi and Charlotte sold $1\frac{1}{2}$ pies.
   - H: Avi and Charlotte each sold the same amount of pie.
   - J: Charlotte and Josh sold $1\frac{3}{10}$ pies.
9. Sasha’s mom bought a container with 150 bracelet beads for Sasha’s birthday party. There were 8 girls at the birthday party to equally share the beads. Between what two amounts of beads should each girl receive?

A. between 15 and 16
B. between 16 and 17
C. between 17 and 18
D. between 18 and 19

10. Which of the following expressions is equal to \( \frac{4}{5} \times 7 \)?

F. \( \frac{4}{5} \div 5 + 7 \)
G. \( 4 \times 7 \div 5 \)
H. \( 4 \times 7 \times 5 \)
J. \( 5 \div 4 \times 7 \)

11. Adam spins a spinner 12 times. The results are shown in the bar graph below. Which fraction of the spins were red or blue?

A. \( \frac{2}{3} \)
B. \( \frac{3}{4} \)
C. \( \frac{7}{12} \)
D. \( \frac{5}{6} \)
A salsa recipe calls for \( \frac{1}{3} \) cup of onions. William wants to multiply the recipe by 4. How many cups of onion will he need?

\[
\text{F} \quad \frac{3}{4} \text{ cup} \\
\text{G} \quad 1 \text{ cup} \\
\text{H} \quad 1 \frac{1}{3} \text{ cups} \\
\text{J} \quad 1 \frac{2}{3} \text{ cups}
\]

The menu below shows the prices at Lunchtime Café. Lucita orders a turkey sandwich and two fruit cups. What expression should she use to determine the cost of her meal?

<table>
<thead>
<tr>
<th>Lunchtime Cafe</th>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turkey Sandwich</td>
<td>$4.50</td>
</tr>
<tr>
<td></td>
<td>Ham Sandwich</td>
<td>$4.35</td>
</tr>
<tr>
<td></td>
<td>Salad</td>
<td>$2.10</td>
</tr>
<tr>
<td></td>
<td>Fruit Cup</td>
<td>$2.50</td>
</tr>
<tr>
<td></td>
<td>Juice</td>
<td>$1.90</td>
</tr>
</tbody>
</table>

\[
\text{A} \quad 4.50 + (2 \times 2.50) \\
\text{B} \quad 4.50 + 2.50 \\
\text{C} \quad 2.50 + (2 \times 4.50) \\
\text{D} \quad 2.50 \times 4.50
\]

Each student in fifth grade donates 4 cans of food to the food bank. There are 285 fifth-grade students. Which of the following shows the number of cans donated and the correct justification for the number?

\[
\text{F} \quad 71 \text{ because } 285 \text{ divided by } 4 \text{ is approximately } 71 \\
\text{G} \quad 289 \text{ because } 285 \text{ plus } 4 \text{ is } 289 \\
\text{H} \quad 1,120 \text{ because } 280 \text{ times } 4 \text{ is } 1,120 \\
\text{J} \quad 1,140 \text{ because } 285 \text{ times } 4 \text{ is } 1,140
\]
15 Mr. Izquierdo is joining a gym. There is a $150 registration fee and a monthly fee of $28. Which expression shows the total cost for Mr. Izquierdo to join the gym for a year?

A \((150 + 28) \times 12\)  
B \(150 \times (28 + 12)\)  
C \((150 \times 12) + 28\)  
D \(150 + (28 \times 12)\)

16 Each week, Melanie saves the same amount of money. After the third week, she has $30. After the fifth week, she has $50. After the seventh week, she has $70. Which operation could Melanie use to determine the amount she will have saved by the tenth week?

F Add 10 to the number of weeks.  
G Add 20 to the numbers of weeks.  
H Multiply 10 times the number of weeks.  
J Multiply 20 times the number of weeks.

17 Carmen created the following table of multiplication facts for 100. If the pattern continues, what is \(100 \times 12\)?

<table>
<thead>
<tr>
<th>#</th>
<th>(\times 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
</tr>
</tbody>
</table>

A 120  
B 210  
C 1,200  
D 2,100
18 Bennett created the table below. Which operation did he perform on the numbers in the left column to find the numbers in the right column?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

F Add 8.  
G Add 9.  
H Multiply by 8.  
J Multiply by 9.

19 Martin notices that certain pickup trucks have 6 wheels. Which table could he use to determine the number of wheels on five of these pickup trucks?

A Trucks 1 2 3 4 5  
  Wheels  4 8 12 16 20  
B Trucks 1 2 3 4 5  
  Wheels  6 12 18 24 30  
C Trucks 1 2 3 4 5  
  Wheels  4 16 64 256 1024  
D Trucks 1 2 3 4 5  
  Wheels  6 36 216 1296 7776
20. Tamera is 4 years younger than her brother. Which expression could you use to determine Tamera’s age, given her brother’s age \( b \)?

   F  \( b + 4 \)  \( \quad \) H  \( b \times 4 \)
   G  \( b - 4 \)  \( \quad \) J  \( b \div 4 \)

21. Use a ruler to measure the length of the rectangle below in centimeters. Convert this length to meters.

   Use a ruler to measure the length of the rectangle below in centimeters. Convert this length to meters.

   \[ \text{length} \]

   A  8 m  \( \quad \) C  0.08 m
   B  0.8 m  \( \quad \) D  0.008 m

22. There are 12 inches in 1 foot, and there are 3 feet in 1 yard. How many inches are there in 1 yard?

   F  12  \( \quad \) H  36
   G  24  \( \quad \) J  48

23. Megan wants to estimate the volume of the box shown below. Which is the best estimate? \( (V = l \times w \times h) \)

   \[ \text{length} \]

   A  50 in\(^3\)  \( \quad \) C  100 in\(^3\)
   B  60 in\(^3\)  \( \quad \) D  110 in\(^3\)

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24. What is the volume of the figure?

\[ \text{Volume} = 1 \text{ cubic unit} \]

- F 10 cubic units
- G 12 cubic units
- H 14 cubic units
- J 16 cubic units

25. Which of the following is equal to 4 gallons?

- A 1 quart
- B 8 quarts
- C 12 quarts
- D 16 quarts

26. A rectangular shoebox is 14 inches long by 8 inches wide by 6 inches tall. What is the volume of the shoebox?

- F 28 cubic inches
- G 668 cubic inches
- H 480 cubic inches
- J 672 cubic inches

27. Look at the coordinate grid below. Which point is located at (2, 5)?

- A Point A
- B Point B
- C Point C
- D Point D
28 On the graph below, \( \triangle ABC \) is graphed. What is the \( x \)-coordinate of point \( A \)?

\[ \begin{array}{ccc}
F & 3 & H & 5 \\
G & 4 & J & 6 \\
\end{array} \]

29 Which of the following does not describe the figure below?

A square
B rectangle.
C quadrilateral
D trapezoid

29 ________

30 Which best describes this figure?

F pentagon
G hexagon
H triangle
J octagon

30 ________
For each part, mark the box under the number of correctly answered questions.

The Number System
Ratios and Proportional Relationships
Expressions and Equations
Geometry
Statistics and Probability

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 6 Strategic Intervention—See page 77 for materials list.
- Glencoe Math, Course 1
## Domain | Question Number | Objective
--- | --- | ---
**The Number System**
- 1 | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 2 | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 3 | Fluently divide multi-digit numbers using the standard algorithm.
- 4 | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
- 5 | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
- 6 | Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.
- 7 | Understand ordering and absolute value of rational numbers.
- 8 | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**Ratios and Proportional Relationships**
- 9 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 10 | Find a percent of a quantity as a rate per 100.
- 11 | Understand the concept of a unit rate \( \frac{a}{b} \) associated with a ratio \( a:b \) with \( b \neq 0 \), and use rate language in the context of a ratio relationship.
- 12 | Understand the concept of a unit rate \( \frac{a}{b} \) associated with a ratio \( a:b \) with \( b \neq 0 \), and use rate language in the context of a ratio relationship.
- 13 | Solve unit rate problems including those involving unit pricing and constant speed.

**Expressions and Equations**
- 14 | Write, read, and evaluate expressions in which letters stand for numbers.
- 15 | Write, read, and evaluate expressions in which letters stand for numbers.
- 16 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.
- 17 | Apply the properties of operations to generate equivalent expressions.
- 18 | Solve real-world and mathematical problems by writing and solving equations of the form \( x + p = q \) and \( px = q \) for cases in which \( p, q \) and \( x \) are all nonnegative rational numbers.
- 19 | Write an inequality of the form \( x > c \) or \( x < c \) to represent a constraint or condition in a real-world or mathematical problem.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometry</td>
<td>20</td>
<td>Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.</td>
</tr>
<tr>
<td>Statistics and Probability</td>
<td>25</td>
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</tr>
<tr>
<td></td>
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<td>Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.</td>
</tr>
<tr>
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<td>Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Recognize that a measure of center for a numerical data set summarizes all of its values with a single number.</td>
</tr>
</tbody>
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When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

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### Find these materials at [www.connectED.mcgraw-hill.com](http://www.connectED.mcgraw-hill.com).

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<tr>
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<tr>
<td>Reteach Masters</td>
<td>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</td>
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<td>Skills Practice Masters</td>
<td>Additional practice in computational and application exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
</tr>
<tr>
<td>Homework Practice Masters</td>
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</tr>
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# Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
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<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 kilometer = 1,000 meters</td>
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<tr>
<td>1 meter = 100 centimeters</td>
<td></td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td></td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td></td>
</tr>
<tr>
<td>1 mile = 1,760 yards</td>
<td>1 gallon = 4 quarts</td>
</tr>
<tr>
<td>1 mile = 5,280 feet</td>
<td>1 gallon = 128 ounces</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td></td>
<td>1 cup = 8 ounces</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td></td>
</tr>
<tr>
<td>1 kilogram = 1,000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1,000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 ton = 2,000 pounds</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
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## Mathematics Chart

<table>
<thead>
<tr>
<th>Area</th>
<th>Formula</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>rectangle</td>
<td>( A = \ell w ) or ( A = bh )</td>
<td>right rectangular prism</td>
</tr>
<tr>
<td>triangle</td>
<td>( A = \frac{1}{2} bh ) or ( A = \frac{bh}{2} )</td>
<td>( V = \ell wh ) or ( V = Bh )</td>
</tr>
<tr>
<td>parallelogram</td>
<td>( A = bh )</td>
<td></td>
</tr>
<tr>
<td>trapezoid</td>
<td>( A = \frac{1}{2} (b_1 + b_2)h ) or ( A = \frac{(b_1 + b_2)h}{2} )</td>
<td></td>
</tr>
</tbody>
</table>
1. The table below shows the length of the hiking trails at a local park. Aaron hikes half of the blue trail. What distance did he hike?

<table>
<thead>
<tr>
<th>Hiking Trails</th>
<th>Trail</th>
<th>Length (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
<td>1.86</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>1.28</td>
</tr>
</tbody>
</table>

A 0.5 mile   B 0.93 mile   C 1.86 miles   D 3.72 miles

2. Candace is knitting a scarf. The scarf is 4.6 feet long. If she knits another 1.75 feet, how long will the scarf be?

F 6.35 feet   G 5.81 feet   H 5.35 feet   J 2.85 feet

3. Ms. Ayala had 152 pencils. She divided the number of pencils equally among 13 students. She kept the leftover pencils in her desk. What is the greatest number of pencils Ms. Ayala could have given each student?

A 9   B 10   C 11   D 12

4. Kono divides the numerator and denominator of \(\frac{48}{72}\) by the greatest common factor to simplify the fraction in one step. By what number does he divide?

F 2   H 16
G 12   J 24
5 After January 1, Aleta has band practice every fourth day and swimming lessons every third day. If both programs end January 31, how many days in January will Aleta have both band practice and swimming lessons?

A 1 day  
B 2 days  
C 3 days  
D 4 days

6 In simplest form, what is the quotient of \( \frac{\frac{1}{6}}{\frac{2}{9}} \)?

F \( \frac{1}{27} \)  
H \( \frac{9}{12} \)  
G \( \frac{2}{54} \)  
J \( \frac{3}{4} \)

7 Which sign makes the number sentence \(-8 \, \square \, -3\) true?

A >  
B <  
C =  
D ≥

8 A triangle has sides measuring 3.54 inches, 5.12 inches, and 2.30 inches. Add to find the perimeter of the triangle.

F 10.69 inches  
G 10.96 inches  
H 11.06 inches  
J 11.96 inches

9 For every 12 slices of pizza sold at Ping’s Pizza Shop, 3 slices are pepperoni, 4 are sausage, and the rest are cheese. What is the ratio of pepperoni to cheese?

A 3:12  
B 3:5  
C 3:4  
D 5:3

10 Kara is training for a 5-kilometer race. On the first day of training, she runs 0.75 kilometer. What percent of the total distance does she run the first day of training?

F 5%  
G 10%  
H 15%  
J 25%

11 A 4-pack of batteries costs $5.16. At this price, what is the cost of one battery?

A $1.29  
B $1.49  
C $5.16  
D $20.64
12 The table shows the cost of ride tickets at the fair. What is the unit rate for one ride ticket?

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>$3.75</td>
</tr>
<tr>
<td>10</td>
<td>$7.50</td>
</tr>
<tr>
<td>15</td>
<td>$11.25</td>
</tr>
<tr>
<td>20</td>
<td>$15.00</td>
</tr>
</tbody>
</table>

F $0.37  G $0.55  H $0.70  J $0.75

13 Kali earned $40 for babysitting for 5 hours. At this rate, how much will she earn for babysitting for 7 hours?

A $8  B $45  C $47  D $56

14 Tia, Veronica, Pam, and Lily are sisters. Tia is 8 years old and she is 2 years older than Pam. Pam is 5 years younger than Veronica and Veronica is 4 years younger than Lily. Which list has the sisters in order from youngest to oldest?

F Tia, Veronica, Pam, Lily  G Lily, Veronica, Tia, Pam  H Tia, Pam, Veronica, Lily  J Pam, Tia, Veronica, Lily

15 The table below shows the cost for different numbers of tickets.

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
</tr>
</tbody>
</table>

Based on the information in the table, which of the following statements is true?

A Each ticket costs $2.  B Each ticket costs $6.  C The more tickets you buy the less each ticket costs.  D The more tickets you buy the greater each ticket costs.

16 Edmundo bought 4 trading cards yesterday. He bought some more trading cards today. Now he has 12 trading cards. If \( n \) represents the number of trading cards Edmundo bought today, which equation is correct?

F \[4 + 12 = n\]  H \[n + 12 = 4\]
G \[4 + n = 12\]  J \[n + 4 = 16\]
17 Which of the following expressions is equivalent to \(7(x + 3)\)?

A \(10 + x\)  
B \(7x + 21\)  
C \(7x + 3\)  
D \(3x + 21\)

18 What is the solution to the equation \(5 + b = 18\)?

F \(b = 5\)  
G \(b = 8\)  
H \(b = 13\)  
J \(b = 23\)

19 Miguel practiced more than 5 hours for his first soccer game. Which inequality represents \(p\), the amount of time Miguel practiced?

A \(p > 5\)  
B \(p < 5\)  
C \(p = 5\)  
D \(p \geq 5\)

20 A rectangular prism is shown below. What is the volume of the prism?

\[
\text{Volume} = \frac{1}{2} \times \frac{5}{6} \times \frac{1}{4} \text{ yd}^3
\]

F \(\frac{1}{2} \text{ yd}^3\)  
G \(\frac{5}{48} \text{ yd}^3\)  
H \(\frac{5}{24} \text{ yd}^3\)  
J \(\frac{7}{12} \text{ yd}^3\)

21 Look at the figure below.

What is the area of the figure?

A \(12 \text{ cm}^2\)  
B \(32 \text{ cm}^2\)  
C \(38 \text{ cm}^2\)  
D \(42 \text{ cm}^2\)
22 Lanu draws a rectangle that is 10 inches wide and 20 inches long. Which rectangle described below has the same area?

F 5 inches wide and 25 inches long
G 8 inches wide and 20 inches long
H 15 inches wide and 15 inches long
J 15 inches wide and 25 inches long

23 A box has a square base with each side measuring 8 inches. The height of the box is 4 inches. What is the surface area of the box in cubic inches?

A 96 square inches
B 192 square inches
C 256 square inches
D 612 square inches

24 On the graph below, what is the length of side AB?

F 3 units
G 4 units
H 5 units
J 6 units

25 Mrs. Brown has a flower garden in the shape of a parallelogram. The length of the base of the garden is 9.5 feet and the height is 4.2 feet. What is the area of the flower garden?

A 19.95 ft²
B 27.4 ft²
C 30.7 ft²
D 39.9 ft²

26 Mrs. Esperanza’s math class is playing a game using two spinners. One spinner has the colors red, blue, and green. The other spinner has the numbers 1, 2, 3, 4, 5, 6, 7, and 8. How many possible outcomes are there?

F 11
G 16
H 21
J 24
27 Trent has a math quiz every Friday. The table below shows his quiz scores. What is the mode of Trent’s scores?

<table>
<thead>
<tr>
<th>Trent’s Math Quiz Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
</tr>
<tr>
<td>Score</td>
</tr>
</tbody>
</table>

A 97  
B 88  
C 82  
D 81

28 Kahlid spins a spinner 10 times. The results are shown in the tally chart below. Which of the following graphs show these results?

29 What is the median of these data?

67, 98, 78, 75, 83, 44, 98

A 44  
B 75  
C 78  
D 98

30 The number of points Ming scored in each basketball game this season are shown below. What is the mean number of points she scored?

| 3 | 7 | 1 | 8 | 2 | 4 | 9 | 10 | 8 | 8 |

F 6  
G 8  
H 9  
J 10
For each part, mark the box under the number of correctly answered questions.

Key: Consider this student for...

- Math Triumphs
- Grade 7 Strategic Intervention—See page 90 for materials list.
- Glencoe Math, Course 2
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<tr>
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<th>Question Number</th>
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<tbody>
<tr>
<td>The Number System</td>
<td>☐ 1</td>
<td>Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.</td>
</tr>
<tr>
<td></td>
<td>☐ 2</td>
<td>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</td>
</tr>
<tr>
<td></td>
<td>☐ 3</td>
<td>Solve real-world and mathematical problems involving the four operations with rational numbers.</td>
</tr>
<tr>
<td></td>
<td>☐ 4</td>
<td>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</td>
</tr>
<tr>
<td>Ratios and Proportional Relationships</td>
<td>☐ 5</td>
<td>Recognize and represent proportional relationships between quantities.</td>
</tr>
<tr>
<td></td>
<td>☐ 6</td>
<td>Recognize and represent proportional relationships between quantities.</td>
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<tr>
<td></td>
<td>☐ 7</td>
<td>Use proportional relationships to solve multistep ratio and percent problems.</td>
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<tr>
<td></td>
<td>☐ 8</td>
<td>Use proportional relationships to solve multistep ratio and percent problems.</td>
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<td></td>
<td>☐ 9</td>
<td>Recognize and represent proportional relationships between quantities.</td>
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<td>☐ 10</td>
<td>Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</td>
</tr>
<tr>
<td>Expressions and Equations</td>
<td>☐ 11</td>
<td>Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.</td>
</tr>
<tr>
<td></td>
<td>☐ 12</td>
<td>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</td>
</tr>
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<td>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</td>
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<tr>
<td></td>
<td>☐ 14</td>
<td>Solve word problems leading to equations of the form ( px + q = r ) and ( p(x + q) = r ), where ( p, q, ) and ( r ) are specific rational numbers. Solve equations of these forms fluently.</td>
</tr>
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<td>☐ 15</td>
<td>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</td>
</tr>
<tr>
<td></td>
<td>☐ 16</td>
<td>Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.</td>
</tr>
<tr>
<td></td>
<td>☐ 17</td>
<td>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically.</td>
</tr>
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<td>Question Number</td>
<td>Objective</td>
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<td>----------------------</td>
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<td>---------------------------------------------------------------------------</td>
</tr>
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<td>Construct triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</td>
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<td>21</td>
<td>Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.</td>
</tr>
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<td></td>
<td>22</td>
<td>Know the formulas for the area and circumference of a circle and use them to solve problems.</td>
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<td>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</td>
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<td></td>
<td>24</td>
<td>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions.</td>
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<tr>
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<td>25</td>
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<td></td>
<td>27</td>
<td>Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams.</td>
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<td>28</td>
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<td>30</td>
<td>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</td>
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</tr>
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</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td></td>
</tr>
<tr>
<td>1 kilogram = 1,000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1,000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td></td>
</tr>
<tr>
<td>1 ton = 2,000 pounds</td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td></td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
</tbody>
</table>
**Mathematics Chart**

<table>
<thead>
<tr>
<th>PERIMETER</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>square</td>
<td>square</td>
</tr>
<tr>
<td>( P = 4s )</td>
<td>( A = s^2 )</td>
</tr>
<tr>
<td>rectangle</td>
<td>rectangle</td>
</tr>
<tr>
<td>( P = 2\ell + 2w ) or ( P = 2(\ell + w) )</td>
<td>( A = \ell w ) or ( A = bh )</td>
</tr>
<tr>
<td>triangle</td>
<td>triangle</td>
</tr>
<tr>
<td>( A = \frac{1}{2} bh ) or ( A = \frac{bh}{2} )</td>
<td>( A = \frac{1}{2} (b_1 + b_2)h ) or ( A = \frac{(b_1 + b_2)h}{2} )</td>
</tr>
<tr>
<td>trapezoid</td>
<td>circle</td>
</tr>
<tr>
<td>( A = \frac{1}{2} (b_1 + b_2)h ) or ( A = \frac{(b_1 + b_2)h}{2} )</td>
<td>( A = \pi r^2 )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CIRCUMFERENCE</th>
<th>VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>circle</td>
<td>cube</td>
</tr>
<tr>
<td>( C = 2\pi r ) or ( C = \pi d )</td>
<td>( V = s^3 )</td>
</tr>
<tr>
<td>right rectangular prism</td>
<td>( V = \ell wh ) or ( V = Bh )</td>
</tr>
</tbody>
</table>

**PI**

\( \pi \approx 3.14 \) or \( \pi \approx \frac{22}{7} \)
Diagnostic and Placement Grade 7

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Nate has 6 $\frac{3}{5}$ yards of fabric. He uses 3 $\frac{1}{2}$ yards of fabric to make a pillow. How much fabric does he have left?
   
   A 3 $\frac{1}{10}$ yards  
   B 3 $\frac{1}{5}$ yards  
   C 3 $\frac{2}{5}$ yards  
   D 4 $\frac{1}{10}$ yards

2. Olivia orders 4 ham sandwiches at the deli. The total amount was $30.52. How much did each sandwich cost?
   
   F $7.63$  
   G $7.83$  
   H $12.63$  
   J $122.08$

3. Mrs. Cheng has $18 deducted monthly from her checking account for her gym membership. What integer represents the change in her account for a year of gym membership?
   
   A $-18$  
   B $-36$  
   C $-180$  
   D $-216$

4. Find $\frac{3}{5} \times 4 \frac{1}{3}$. Write in simplest form.
   
   F $\frac{9}{16}$  
   G 2  
   H $2\frac{3}{5}$  
   J $4\frac{14}{15}$

5. On a map, 3 inches represent an actual distance of 42 miles. If the actual distance between two cities is 322 miles, how many inches apart will the two cities be on the map?
   
   A 8 inches  
   B 14 inches  
   C 23 inches  
   D 107 inches

Name ______________________  
Date ______________________
6. Tyler earned $68 for babysitting 8 hours. If Tyler is paid the same rate, how much will he earn for babysitting 12 hours?

   F $8.50  
   G $80  
   H $102  
   J $816

7. Charlene bought her friends lunch. The bill came to $52.80 before Charlene added an 18% service tip. How much did she add for the service tip?

   A $4.75  
   B $5.70  
   C $9.50  
   D $10.20

8. The school band sold 200 tickets to their concert. If 90 of the tickets were adult tickets, what percent of the tickets sold were adult tickets?

   F 18%  
   G 45%  
   H 55%  
   J 90%

9. A car travels 528 miles on 16 gallons of gas. At the same rate, how many gallons of gas are needed to travel 165 miles?

   A 4  
   B 5  
   C 6  
   D 7

10. The table shows the cost of blueberries at a local farmer’s market. What is the unit price for one ounce of blueberries?

<table>
<thead>
<tr>
<th>Ounces</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>$1.80</td>
</tr>
<tr>
<td>12</td>
<td>$3.60</td>
</tr>
<tr>
<td>18</td>
<td>$5.40</td>
</tr>
</tbody>
</table>

   F $0.30 per ounce  
   G $0.40 per ounce  
   H $0.60 per ounce  
   J $1.80 per ounce

11. Which expression is equivalent to $5x + 2 - x + 10$?

   A $4x + 12$  
   B $6x + 12$  
   C $4x - 8$  
   D $6x - 8$
12. A triangle has a height that is 5 units shorter than its base. If $b$ represents the base and $h$ represents the height, which of the following equations represent the area of the triangle?

- **F** $A = \frac{1}{2}(b - 5)$
- **H** $A = \frac{1}{2}b(b - 5)$
- **G** $A = \frac{1}{2}(h - 5)$
- **J** $A = \frac{1}{2}(b - 5)h$

13. Which equation shows the relationship between the $x$- and $y$-values in the table to the right?

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

- **A** $y = x - 2$
- **B** $x = y + 2$
- **C** $y = x + 2$
- **D** $y = \frac{x}{2}$

14. What is the solution to the equation $3t - 10 = 8$?

- **F** $t = 3$
- **G** $t = 6$
- **H** $t = 8$
- **J** $t = 9$

15. Randy is playing a number game. Beginning with the number 8, he adds 4, multiples by 5, and then divides by $-10$. He then subtracts 2. What number does he find at the end of the game?

- **A** $-8$
- **B** $-6$
- **C** 6
- **D** 8

16. The table below shows the charges for a taxi ride in a city.

<table>
<thead>
<tr>
<th>Charges for Each Taxi Ride</th>
<th>Charges</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage Charge</td>
<td>$0.75 Each Mile</td>
<td></td>
</tr>
<tr>
<td>City Gas Tax</td>
<td>$0.10 Each Mile</td>
<td></td>
</tr>
<tr>
<td>Tourist Charge</td>
<td>$2.50</td>
<td></td>
</tr>
</tbody>
</table>

If a taxi ride is $m$ miles, which expression can be used to find the total charge of the ride?

- **F** $2.50m + 0.75$
- **G** $0.75m + 2.50$
- **H** $0.10m + 3.25$
- **J** $0.85m + 2.50$
17. Michael's age is 5 years younger than Jordan. Jordan is 4 years younger than Keanu. Keanu is 17 years old. How old is Michael?

A. Michael is 12 years old, because he is 5 years younger than Keanu.
B. Michael is 22 years old, because he is 5 years older than Keanu.
C. Michael is 8 years old, because he is 5 years younger than Jordan, and Jordan is 13 years old.
D. Michael is 18 years old, because he is 5 years older than Jordan, and Jordan is 13 years old.

18. Jeb's weight \( w \) is \( \frac{1}{3} \) of Iago's weight \( a \). Which equation could be used to find Jeb's weight?

F. \( w = a - \frac{1}{3} \)
H. \( w = \frac{1}{3} + a \)
G. \( w = \frac{1}{3}a \)
J. \( w = a \div \frac{1}{3} \)

19. An electrician charges $30 for a house visit and $55 for each hour of work. If Mrs. Firewalks was charged $222.50 for work, which can be used to find the number of hours that the electrician worked?

A. Subtract 55 from 222.50 and then divide the difference by 30.
B. Subtract 30 from 222.50 and then divide the difference by 55.
C. Divide 222.50 by 55.
D. Divide 222.50 by 30.

20. Diane draws an obtuse, isosceles triangle with one of the angles measuring 35°. What is the measure of the obtuse angle in her triangle?

F. 35°
G. 55°
H. 110°
J. 145°

21. The measure of \( \angle B \) in parallelogram \( ABCD \) is 75°. What is the measure of \( \angle A \)?

A. 75°
B. 105°
C. 150°
D. 210°
22 The circumference of a circle is \(20\pi\). What is the radius of this circle?

\[ F\ 2 \quad G\ 10 \quad H\ 20 \quad J\ 40 \]

23 Find the surface area of the composite figure below.

\[ A\ 184\ \text{in}^2 \quad B\ 416\ \text{in}^2 \quad C\ 744\ \text{in}^2 \quad D\ 840\ \text{in}^2 \]

24 Which of the following is closest to the measure of the angle shown below?

\[ F\ 50^\circ \quad G\ 80^\circ \quad H\ 130^\circ \quad J\ 180^\circ \]

25 The height of a box is 6 inches. The length of the box is 14 inches and the width of the box is 4 inches.

Which equation could be used to find the surface area of the box?

\[ A\ s = 2 \cdot (14 \cdot 6) + 2 \cdot (4 \cdot 6) \quad C\ s = 2 \cdot (14 \cdot 4) + 2 \cdot (14 \cdot 6) + 2 \cdot (6 \cdot 4) \]

\[ B\ s = (14 \cdot 4) + (14 \cdot 6) + (6 \cdot 4) \quad D\ s = (14 \cdot 4) \cdot (14 \cdot 6) \cdot (6 \cdot 4) \]
26 Booker has a bag of marbles. There are 10 blue marbles, 6 yellow marbles, and 4 red marbles. Booker reaches into the bag without looking and picks a marble. What is the probability that he picks a red marble?

F $\frac{1}{3}$  G $\frac{1}{4}$  H $\frac{1}{5}$  J $\frac{1}{20}$

27 To win a prize, a player picks a door and then a box behind the door. There are 3 doors and 4 boxes behind each door. How many prizes can be won if each box has a different prize?

A 3  B 4  C 7  D 12

28 There are 10 marbles in a bag: 1 blue, 4 yellow, 3 red, and 2 white. If you choose a marble at random, which is the probability that you will NOT choose white?

F 20%  G 25%  H 75%  J 80%

29 Juan needs to choose an outfit from his closet. He can choose from a red, green, or blue T-shirt and he can choose from a pair of blue, tan, or black pants. Which table shows all possible outfits if Juan picked one shirt and one pair of pants at random?

A

<table>
<thead>
<tr>
<th>Shirts</th>
<th>Pants</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>blue</td>
</tr>
<tr>
<td>green</td>
<td>black</td>
</tr>
<tr>
<td>blue</td>
<td>tan</td>
</tr>
</tbody>
</table>

B

<table>
<thead>
<tr>
<th>Shirts</th>
<th>Pants</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>blue</td>
</tr>
<tr>
<td>green</td>
<td>blue</td>
</tr>
<tr>
<td>blue</td>
<td>black</td>
</tr>
<tr>
<td>green</td>
<td>black</td>
</tr>
<tr>
<td>blue</td>
<td>tan</td>
</tr>
</tbody>
</table>

C

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>red</td>
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<tr>
<td>green</td>
<td>black</td>
</tr>
<tr>
<td>blue</td>
<td>tan</td>
</tr>
</tbody>
</table>

D

<table>
<thead>
<tr>
<th>Shirts</th>
<th>Pants</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>blue</td>
</tr>
<tr>
<td>green</td>
<td>black</td>
</tr>
<tr>
<td>blue</td>
<td>tan</td>
</tr>
</tbody>
</table>

30 A jar contains 4 green marbles, 2 pink marbles, and 3 striped marbles. One marble is picked at random and then replaced. Then another marble is drawn at random again. What is the probability that both marbles are striped?

F $\frac{1}{81}$  H $\frac{1}{3}$

G $\frac{1}{9}$  J $\frac{1}{2}$
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

Key: Consider this student for...

- Math Triumphs
- Grade 8 Strategic Intervention—See page 103 for materials list.
- Glencoe Math, Course 3
**Student Name __________________________**

In the column on the left, mark the questions that the student answered *incorrectly.*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Number System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Use rational approximations of irrational numbers to compare the size of irrational numbers.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Use rational approximations of irrational numbers to estimate the value of expressions.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Know that numbers that are not rational are called irrational.</td>
</tr>
<tr>
<td><strong>Expressions and Equations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Graph proportional relationships.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Solve linear equations in one variable.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Solve linear equations in one variable.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Perform operations with numbers expressed in scientific notation.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Perform operations with numbers expressed in scientific notation.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Know and apply the properties of integer exponents to generate equivalent numerical expressions.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Analyze and solve pairs of simultaneous linear equations.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Solve linear equations with rational number coefficients, including equations whose solutions require using the distributive property.</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td>12</td>
<td>Construct a function to model a linear relationship between two quantities.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Understand that a function is a rule that assigns to each input exactly one output.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Understand that a function is a rule that assigns to each input exactly one output.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Describe qualitatively the functional relationship between two quantities by analyzing a graph.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Geometry</td>
<td>18</td>
<td>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</td>
</tr>
<tr>
<td>Statistics and Probability</td>
<td>28</td>
<td>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.</td>
</tr>
</tbody>
</table>
A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Math Triumphs</em> to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>Glencoe Math</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Grade 8</td>
<td>24 or more</td>
<td>Use <em>Glencoe Math</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 1 or more questions in the Function section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
<tr>
<td>Materials</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Reteach Masters</td>
<td>A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters</td>
<td></td>
</tr>
<tr>
<td>Skills Practice Masters</td>
<td>Additional practice in computational and application exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
<td></td>
</tr>
<tr>
<td>Homework Practice Masters</td>
<td>Additional practice in computational and spiral review exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
<td></td>
</tr>
<tr>
<td>Self-Check Quizzes</td>
<td>Students can check their understanding for each lesson and email their results to the teacher</td>
<td></td>
</tr>
<tr>
<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition</td>
<td></td>
</tr>
<tr>
<td>Personal Tutor</td>
<td>Online instructions for step-by-step solutions for the examples of each lesson in the student textbook</td>
<td></td>
</tr>
<tr>
<td>Quick Review Skills Workbook</td>
<td>Additional computational practice in basic skills</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Technology**

| ExamView® Assessment Suite        | Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records |
# Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CAPACITY AND VOLUME</th>
</tr>
</thead>
<tbody>
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<td><strong>Metric</strong></td>
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</tr>
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<td>1 kilometer = 1,000 meters</td>
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<td></td>
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<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilogram = 1,000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1,000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 ton = 2,000 pounds</td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td></td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
</tbody>
</table>
## Mathematics Chart

<table>
<thead>
<tr>
<th><strong>PERIMETER</strong></th>
<th><strong>AREA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>square</strong></td>
<td><strong>square</strong></td>
</tr>
<tr>
<td>$P = 4s$</td>
<td>$A = s^2$</td>
</tr>
<tr>
<td><strong>rectangle</strong></td>
<td><strong>rectangle</strong></td>
</tr>
<tr>
<td>$P = 2\ell + 2w$ or</td>
<td>$A = \ell w$ or</td>
</tr>
<tr>
<td>$P = 2(\ell + w)$</td>
<td>$A = bh$</td>
</tr>
<tr>
<td><strong>triangle</strong></td>
<td><strong>triangle</strong></td>
</tr>
<tr>
<td>$A = \frac{1}{2}bh$ or</td>
<td>$A = \frac{bh}{2}$</td>
</tr>
<tr>
<td>$A = \frac{1}{2}(b_1 + b_2)h$ or</td>
<td></td>
</tr>
<tr>
<td>$A = \frac{(b_1 + b_2)h}{2}$</td>
<td></td>
</tr>
<tr>
<td><strong>trapezoid</strong></td>
<td></td>
</tr>
<tr>
<td>$A = \pi r^2$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CIRCUMFERENCE</strong></th>
<th><strong>VOLUME</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>circle</strong></td>
<td><strong>cube</strong></td>
</tr>
<tr>
<td>$C = 2\pi r$ or</td>
<td>$V = s^3$</td>
</tr>
<tr>
<td>$C = \pi d$</td>
<td></td>
</tr>
<tr>
<td><strong>rectangular prism</strong></td>
<td><strong>rectangular prism</strong></td>
</tr>
<tr>
<td>$V = \ell wh$ or</td>
<td>$V = Bh*$</td>
</tr>
<tr>
<td>$V = Bh*$</td>
<td></td>
</tr>
<tr>
<td><strong>triangular prism</strong></td>
<td><strong>triangular prism</strong></td>
</tr>
<tr>
<td>$V = Bh*$</td>
<td>$V = \pi r^2 h$ or</td>
</tr>
<tr>
<td>$V = \frac{1}{3} Bh*$</td>
<td>$V = \frac{1}{3} Bh*$</td>
</tr>
<tr>
<td><strong>cylinder</strong></td>
<td><strong>cone</strong></td>
</tr>
<tr>
<td>$V = \pi r^2 h$ or</td>
<td>$V = \frac{1}{3} \pi r^3$</td>
</tr>
<tr>
<td>$V = Bh*$</td>
<td>$V = \frac{1}{3} Bh*$</td>
</tr>
<tr>
<td><strong>cone</strong></td>
<td></td>
</tr>
<tr>
<td>$V = \frac{4}{3} \pi r^3$</td>
<td></td>
</tr>
</tbody>
</table>

*B represents the area of the base of a solid figure.

<table>
<thead>
<tr>
<th><strong>PI</strong></th>
<th><strong>PYTHAGOREAN THEOREM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$</td>
<td>$a^2 + b^2 = c^2$</td>
</tr>
</tbody>
</table>
Diagnostic and Placement
Grade 8

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Which set of numbers is ordered from least to greatest?
   - A  $\frac{3}{8}, \frac{1}{2}, 1; \sqrt{2}, 4$
   - B  $\frac{3}{8}, \frac{1}{2}; \sqrt{2}; 1; 4$
   - C  $4; \sqrt{2}; 1; \frac{1}{2}; \frac{3}{8}$
   - D  $\frac{1}{2}; \frac{3}{8}; 1; 4; \sqrt{2}$

2. The area of a square is 8 square meters. Which of these is closest to the length of one side of the square?
   - F  2 meters
   - G  2.8 meters
   - J  4 meters
   - H  3.5 meters

3. Which of the following sets of numbers does $\sqrt{49}$ NOT belong?
   - A  integer
   - B  real number
   - C  rational number
   - D  irrational number
4 The table shows circles and their corresponding diameters. Which of the following graphs show the correct relationship between the radius and the area of each circle?

<table>
<thead>
<tr>
<th>Circles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>T</td>
</tr>
<tr>
<td>U</td>
</tr>
</tbody>
</table>

F

H

G

J

5 The picture models the equation $5x + 2 = 3x + 6$.

What value of $x$ makes the equation true?

A $x = 1$

B $x = 2$

C $x = 4$

D $x = 6$

6 In $\triangle ABC$, the measure of $\angle A$ is $33^\circ$ and the measure of $\angle C$ is $90^\circ$. What is the measure of $\angle B$?

F $17^\circ$

G $57^\circ$

H $137^\circ$

J $147^\circ$
7 Light travels at a speed of about $2.998 \times 10^8$ meters per second. Express this number in standard notation.

A 299,800,000  
B 0.00002998  
C 0.0000002998  
D 29,980,000

8 A thunderstorm cloud holds about 6,200,000,000 raindrops. Which of the following shows this number in scientific notation?

F $0.62 \times 10^{10}$  
G $6.2 \times 10^{9}$  
H $6.2 \times 10^8$  
J $62.0 \times 10^8$

9 Which of the following is equivalent to the expression $4^4 \times 4^{-6}$?

A $\frac{1}{4^2}$  
B $\frac{1}{4^{10}}$  
C $4^{10}$  
D $4^2$

10 What is true concerning the lines graphed by the system of equations shown below?

\[ \begin{align*}
8x + 6 &= 2y \\
12x - 3 &= 3y
\end{align*} \]

F The lines intersect.  
G The lines are perpendicular.  
H The lines are parallel.  
J The lines are the same.

11 What is the solution of the equation?

\[ \frac{1}{3}(x + 15) = 7 \]

A $x = \frac{2}{3}$  
B $x = 2$  
C $x = 6$  
D $x = 36$

12 What function is represented in the table?

<table>
<thead>
<tr>
<th>$n$</th>
<th>$f(n)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>$n$</td>
<td></td>
</tr>
</tbody>
</table>

F $f(n) = n + 3$  
G $f(n) = 4n - 1$  
H $f(n) = 4n + 2$  
J $f(n) = 3n - 2$
13 Mr. Wilson wrote the function \( f(x) = 7x - 15 \) on the chalkboard. What is the value of this function for \( f(6) \)?

A 27  B 37  C 42  D 57

14 On average, a dog runs 5.5 times faster than a child. Which function can be used to find the speed of a dog, given the speed of the child?

F \( f(c) = 5.5c \)  H \( f(c) = c + 5.5 \)
G \( f(c) = \frac{5.5}{c} \)  J \( f(c) = \frac{c}{5.5} \)

15 What is the slope and \( y \)-intercept of the equation
\( 6x - 1 = 3y - 10 \)?

A \( m = 2, b = 3 \)  C \( m = 3, b = 4 \)
B \( m = 2, b = -3 \)  D \( m = 6, b = 9 \)

16 Which best describes the graph of the function \( f(x) = 4x \)?

F A straight line through the origin with a steep slope upward to the right.
G A straight line through the origin with a steep slope downward to the right.
H A straight line through 4 on the \( x \)-axis with a slope downward to the right.
J A straight line through 4 on the \( y \)-axis with a slope upward to the right.

17 Which function described below has the greatest rate of change?

I \( f(x) = 4x - 3 \)
II \( f(x) = \frac{1}{2}x + 5 \)
III

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
</tr>
</tbody>
</table>

A I  B II  C III  D They all have the same rate of change.

18 The delivery ramp at the Corner Café is a right triangle. The hypotenuse is 4 meters long. One leg is 3 meters long. What is the length of the other leg?

F \( \sqrt{7} \) meters  H 3.5 meters
G \( \sqrt{12} \) meters  J 5 meters
19 The map below shows where four of Nahimana’s friends live. Each unit on the map represents 1 mile.

About how far apart do Aesha and Josh live?
A about 5 mi   B about 6 mi   C about 7.5 mi   D about 8.5 mi

20 What is the volume of the cylinder shown below?

F 44 ft³   H 138.16 ft³
G 69.08 ft³   J 276.32 ft³

21 What is the difference in the volume of the two triangular prisms shown below?

A 32 cm³   C 1,675 cm³
B 158 cm³   D 3,350 cm³

22 A photo with a length of 3 inches and a width of 5 inches is enlarged to poster size. The poster and the photo are similar. The length of the poster is 21 inches. What is the width of the poster?
F 7.2 inches   H 19 inches
G 12.6 inches   J 35 inches
23 Rectangle $ABCD$ is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle $ABCD$ over the following: $(x, y) \rightarrow (x+1, y-2)$?

![Grid with points A, B, C, and D]

24 A rectangle is cut along its diagonal. The measure of $\angle A$ is $55^\circ$. What is the measure of $\angle B$?

![Diagram of a rectangle with diagonal]

F $125^\circ$   G $105^\circ$   H $45^\circ$   J $35^\circ$

25 A 26-foot rope is used to brace a tent pole at the county fair. The rope is anchored 10 feet from the box of the pole. How tall is the tent pole?

A 21.8ft   B 24ft   C 28ft   D 30ft
26 A cylindrical water tower is 24 feet high and has a diameter of 20 feet. Approximately how many cubic feet of water could the tower hold?

F 2,400 cubic feet  
G 7,500 cubic feet  
H 9,600 cubic feet  
J 30,200 cubic feet

27 The triangles below are similar triangles. Find the value of $x$ and $y$.

\[
\begin{align*}
\text{3 cm} & \quad \text{5 cm} \\
\text{4 cm} & \quad \text{10 cm}
\end{align*}
\]

A $x = 6, y = 8$  
B $x = 3, y = 4$  
C $x = 1.5, y = 2$  
D $x = 12, y = 16$

28 The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. What can be concluded from this data?

\[
\begin{align*}
\text{Sales (in thousands of dollars)} & \\
\text{Advertising Expenditures (in dollars)}
\end{align*}
\]

F As advertising increases, sales tend to decrease.  
G As advertising increases, sales tend to increase.  
H As advertising increases, sales remain the same.  
J As advertising increases, sales always increase.
29 The box plot shows a set of test scores. Which statement is correct?

A More students scored between 40 and 60 points than between 88 and 96 points.
B An equal number of students scored from 40 to 60 as from 88 to 96.
C The lowest score was 60.
D The highest score was 88.

30 A survey is taken to determine which type of vehicle is most popular. The data is shown in the bar graph below.

What can you conclude about the survey?

F The survey is biased because most men do not favor sports vehicles.
G The survey is biased because there are more men surveyed than women.
H The survey is not biased because sports cars are most popular among both men and women.
J The survey is not biased because all car types are favored by both men and women.
For each part, mark the box under the number of correctly answered questions.

Expressions and Equations

The Number System

Functions

Geometry

Statistics and Probability

Mark the total number correct below.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: Consider this student for...

- [ ] Glencoe Pre-Algebra
- [ ] Algebra 1 Strategic Intervention—See page 118 for materials list.
- [ ] Glencoe Algebra 1
### Student Name

In the column on the left, mark the questions that the student answered *incorrectly.*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expressions and Equations</strong></td>
<td>1</td>
<td>Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Compare two different proportional relationships represented in different ways.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Know and apply the properties of integer exponents to generate equivalent numerical expressions.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Solve systems of two linear equations in two variables algebraically.</td>
</tr>
<tr>
<td><strong>The Number System</strong></td>
<td>8</td>
<td>Explain why the sum or product of two rational numbers is rational.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Know that numbers that are not rational are called irrational.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td>13</td>
<td>Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Give examples of functions that are not linear.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Understand that a function is a rule that assigns to each input exactly one output.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Describe qualitatively the functional relationship between two quantities by analyzing a graph.</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Functions</td>
<td>17</td>
<td>Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Determine the rate of change and initial value of the function from a description of a relationship or from two ((x, y)) values, including reading these from a table or from a graph.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.</td>
</tr>
</tbody>
</table>
### A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

<table>
<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Glencoe Pre-Algebra</em> to accelerate the achievement of students who are below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>Glencoe Algebra 1</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Algebra 1</td>
<td>24 or more</td>
<td>Use <em>Glencoe Algebra 1</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 3 or more questions in the Geometry section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>
Algebra 1

Find these materials at [www.connectED.mcgraw-hill.com](http://www.connectED.mcgraw-hill.com).

<table>
<thead>
<tr>
<th>Study Guide and Intervention Masters</th>
<th>A brief explanation, along with examples and exercises, for every lesson in the Student Edition and included in the Chapter Resource Masters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills Practice Masters</td>
<td>Additional practice in computational and application exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
</tr>
<tr>
<td>Practice Masters</td>
<td>Additional practice in computational and spiral review exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
</tr>
<tr>
<td>Self-Check Quizzes</td>
<td>Students can check their understanding for each lesson and email their results to the teacher</td>
</tr>
<tr>
<td>Chapter Readiness Quizzes</td>
<td>Online assessment to use at the beginning of each chapter in the Student Edition</td>
</tr>
<tr>
<td>Personal Tutor</td>
<td>Online instructions for step-by-step solutions for the examples of each lesson in the student textbook</td>
</tr>
</tbody>
</table>

### Additional Print Materials

<table>
<thead>
<tr>
<th>Study Guide and Intervention Workbook</th>
<th>Consumable version of the Study Guide and Intervention Masters for each lesson.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Practice Workbook</td>
<td>Consumable version of the Practice Masters for each lesson.</td>
</tr>
</tbody>
</table>

### Additional Technology

| ExamView® Assessment Suite            | Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records |

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### Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CAPACITY AND VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilometer = 1000 meters</td>
<td>1 liter = 1000 milliliters</td>
</tr>
<tr>
<td>1 meter = 100 centimeters</td>
<td></td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td></td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 mile = 1760 yards</td>
<td>1 gallon = 4 quarts</td>
</tr>
<tr>
<td>1 mile = 5280 feet</td>
<td>1 gallon = 128 ounces</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td><strong>MASS AND WEIGHT</strong></td>
<td><strong>TIME</strong></td>
</tr>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Time</strong></td>
</tr>
<tr>
<td>1 kilogram = 1000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 ton = 2000 pounds</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
</tbody>
</table>
### Mathematics Chart

#### PERIMETER

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>square</td>
<td>$P = 4s$</td>
</tr>
<tr>
<td>rectangle</td>
<td>$P = 2\ell + 2w$ or $P = 2(\ell + w)$</td>
</tr>
</tbody>
</table>

#### AREA

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>square</td>
<td>$A = s^2$</td>
</tr>
<tr>
<td>rectangle</td>
<td>$A = \ell w$ or $A = bh$</td>
</tr>
<tr>
<td>triangle</td>
<td>$A = \frac{1}{2} bh$ or $A = \frac{bh}{2}$</td>
</tr>
<tr>
<td>trapezoid</td>
<td>$A = \frac{1}{2} (b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$</td>
</tr>
<tr>
<td>circle</td>
<td>$A = \pi r^2$</td>
</tr>
</tbody>
</table>

#### CIRCUMFERENCE

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>circle</td>
<td>$C = 2\pi r$ or $C = \pi d$</td>
</tr>
</tbody>
</table>

**B** represents the area of the base of a solid figure.

**P** represents the Perimeter of the Base of a three-dimensional figure.

#### VOLUME

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>cube</td>
<td>$V = s^3$</td>
</tr>
<tr>
<td>rectangular prism</td>
<td>$V = \ell wh$ or $V = Bh$</td>
</tr>
<tr>
<td>triangular prism</td>
<td>$V = Bh$</td>
</tr>
<tr>
<td>cylinder</td>
<td>$V = \pi r^2h$ or $V = Bh$</td>
</tr>
<tr>
<td>cone</td>
<td>$V = \frac{1}{3} \pi r^2h$ or $V = \frac{1}{3} Bh$</td>
</tr>
</tbody>
</table>

#### SURFACE AREA

<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>cube (total)</td>
<td>$S = 6s^2$</td>
</tr>
<tr>
<td>prism (lateral)</td>
<td>$S = Ph$</td>
</tr>
<tr>
<td>prism (total)</td>
<td>$S = Ph + 2B$</td>
</tr>
<tr>
<td>pyramid (lateral)</td>
<td>$S = \frac{1}{2} P\ell$</td>
</tr>
<tr>
<td>pyramid (total)</td>
<td>$S = \frac{1}{2} P\ell + B$</td>
</tr>
<tr>
<td>cylinder (lateral)</td>
<td>$S = 2\pi rh$</td>
</tr>
<tr>
<td>cylinder (total)</td>
<td>$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$</td>
</tr>
</tbody>
</table>

#### PI

$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

#### PYTHAGOREAN THEOREM

$a^2 + b^2 = c^2$

#### SIMPLE INTEREST FORMULA

$I = prt$
Diagnostic and Placement Tests

Algebra 1

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Jake goes to the grocery store and buys 3 apples, 2 cans of soup, and 1 box of cereal. The apples cost $0.89 each; the soup costs $2.98 per can; and the box of cereal costs $4.99. Write an equation that represents the total cost $c$ of Jake's purchases.

   A. $c = (3 + 0.89) + (2 + 2.98) + 4.99$
   B. $c = (3 + 0.89) \cdot (3 + 2.98) + 4.99$
   C. $c = (3 \cdot 0.89) + (2 \cdot 2.98) + 4.99$
   D. $c = (3 \cdot 0.89) \cdot (2 \cdot 2.98) \cdot 4.99$

2. Mr. Thomas wants to buy a boat. He must make 48 monthly payments to pay back the amount he borrowed, plus interest. His monthly payment is $161.85. What other information is necessary to determine the amount of money Mr. Thomas borrowed from the bank?

   F. How much Mr. Thomas makes per month
   G. The interest rate the bank charges
   H. How much a boat license costs
   J. How much the value of the boat will increase

3. Ricky jogs 5 laps around a track in 8 minutes. Which of the following would be the same number of laps per minute?

   A. 7 laps in 9.6 minutes
   B. 10 laps in 15.6 minutes
   C. 12 laps in 19.2 minutes
   D. 8 laps in 20 minutes

4. The planet Mercury is about $5.80 \times 10^7$ kilometers from the Sun. Express this number in standard notation.

   F. 0.00000058
   G. 0.00000058
   H. 5,800,000
   J. 58,000,000

5. Which of the following is equivalent to the expression $8^{-5} \times 8^2$?

   A. $\frac{1}{8^7}$
   B. $\frac{1}{8^3}$
   C. $8^3$
   D. $8^7$
6 What is the solution of the equation?

\[ \frac{2}{5} (y + 10) = 8 \]

F \( y = -5 \)  G \( y = 10 \)  H \( y = 20 \)  J \( y = 30 \)

7 What is the solution of the system of equations?

\[
\begin{align*}
    y &= 2x \\
    y &= x + 5
\end{align*}
\]

A \((0, 5)\)  C \((2, 7)\)  B \((\frac{1}{3}, \frac{6}{3})\)  D \((5, 10)\)

8 Barb walked 1.3 miles to her friend’s house and then \( \frac{3}{4} \) mile to the library. How far did Barb walk in all?

F \( 1\frac{9}{40} \) miles  H \( 2\frac{1}{20} \) miles  G \( 1\frac{3}{7} \) miles  J \( 2\frac{1}{10} \) miles

9 Which of the following sets of numbers does \( \sqrt{121} \) NOT belong?

A integer  C rational number  B real number  D irrational number

10 What is the decimal expansion of \( -\frac{11}{15} \)?

F \(-0.7\)  H \(-0.73\)  G \(-0.73\)  J \(-0.7\)

11 Between which two numbers on a number line does \( \sqrt{70} \) fall?

A 6 and 7  C 8 and 9  B 7 and 8  D 9 and 10
12 Which of the following sets of numbers is correctly ordered from least to greatest?

F  4.2, \( \sqrt{16}, \frac{4}{3}, \sqrt{18} \)

G  4.2, \( \sqrt{16}, \sqrt{18}, \frac{4}{3} \)

H  \( \sqrt{16}, 4.2, \frac{4}{3}, \sqrt{18} \)

J  \( \sqrt{16}, 4.2, \sqrt{18}, \frac{4}{3} \)

13 Which algebraic expression can be used to find the \( n \)th term in the following sequence?

6, 10, 14, 18, 22, ...

A  \( n + 4 \)  B  \( 6n + 4 \)  C  \( 6n \)  D  \( 4n + 2 \)

14 Which of the following is not a linear function?

F  \( y = \frac{1}{3}x - 2 \)

G  \( y = 2x^2 \)

J  A straight line through the origin with a steep slope upward to the right.

15 Mrs. Junkin wrote the function \( f(x) = \frac{2}{3}x - 5 \) on the chalkboard. What is the value of this function for \( f(6) \)?

A  -1  B  1  C  7  D  9

16 Which best describes the graph of the function \( f(x) = -5x \)?

F  A straight line through the origin with a steep slope upward to the right.

G  A straight line through the origin with a steep slope downward to the right.

H  A straight line through \(-5\) on the \( x \)-axis with a slope downward to the right.

J  A straight line through \(-5\) on the \( y \)-axis with a slope upward to the right.
17. Which function described below has the greatest rate of change?

I. \( f(x) = 5x + 7 \)

II. \( f(x) = \frac{1}{3}x - 1 \)

III. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

A. I
B. II
C. III
D. They all have the same rate of change.

18. What is the slope of the function described in the table below?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>2</td>
<td>-2</td>
</tr>
<tr>
<td>4</td>
<td>-1</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

F. \(-3\)  
G. \(\frac{1}{2}\)  
H. 2  
J. 3

19. Robin’s neighborhood is mapped out on the graph below. Each unit on the map represents 1 mile.

About how far apart are the park and diner?

A. about 4 miles  
B. about 5 miles  
C. about 6.4 miles  
D. about 10 miles
20 Jason is experimenting with different ramps to replace the stair step into his house. The table below shows the measure of a given angle \( m \) and its complement.

<table>
<thead>
<tr>
<th>Measure of ( m )</th>
<th>Measure of ( m )'s Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>85°</td>
</tr>
<tr>
<td>15°</td>
<td>75°</td>
</tr>
<tr>
<td>25°</td>
<td>65°</td>
</tr>
<tr>
<td>35°</td>
<td>55°</td>
</tr>
<tr>
<td>45°</td>
<td>45°</td>
</tr>
</tbody>
</table>

Based on the table, which of the following statements is true?

F As the measure of \( m \) decreases, its complement decreases by 10 degrees.
G \( m \) and its complement form an acute angle.
H The sum of the measures of \( m \) and its complement is 90.
J Subtracting 45 from the measure of \( m \) will determine its complement.

21 The following figures are formed using a semicircle and a rectangle.

Based on this pattern, what will be the area of the next figure?

A 266.625 cm\(^2\) because the next figure will decrease in area by \( \frac{1}{2} \) the previous figure.
B 173.25 cm\(^2\) because the next figure will decrease in area by 360 cm\(^2\).
C 353.25 cm\(^2\) because the next figure will decrease in area by 180 cm\(^2\).
D 443.25 cm\(^2\) because the next figure will decrease in area by 90 cm\(^2\).
22 Rectangle $ABCD$ is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle $ABCD$ over the following: $(x, y) \rightarrow (x-2, y+1)$?

F

H

G

J

23 A photo with a length of 4 inches and a width of 6 inches is enlarged to fit in a large picture frame. The photo and the enlarged picture are similar. The length of the enlarged picture is 14 inches. What is the width of the enlarged picture?

A 9.3 inches  
B 14 inches  
C 21 inches  
D 56 inches

24 The lengths of the sides of a right triangle are 9 centimeters and 40 centimeters. What is the length of the hypotenuse?

F 31 centimeters  
G 41 centimeters  
H 49 centimeters  
J 81 centimeters
25. Which of the following represents the measures of the sides of a right triangle?
   A 9 cm, 12 cm, 15 cm
   B 6 cm, 7 cm, 8 cm
   C 5 cm, 10 cm, 12 cm
   D 7 cm, 12 cm, 13 cm

26. A cylindrical soup can has a radius of 4 centimeters and a height of 12 centimeters. What is the volume of the soup can to the nearest tenth?
   F 150.8 cm³
   G 192.0 cm³
   H 301.4 cm³
   J 603.2 cm³

27. Four cards numbered 1, 5, 8, and 9 are placed in a bag. A card is drawn at random and then replaced. Then a card is drawn at random again. What is the probability that both cards drawn have the number 9?
   A \(\frac{1}{16}\)
   B \(\frac{1}{9}\)
   C \(\frac{1}{4}\)
   D \(\frac{1}{2}\)

28. A company has five employees. Their annual earnings, in dollars, are shown below.

| 24,000 | 24,000 | 28,000 | 30,000 | 125,000 |

Which of the following measures best represents the typical annual earnings of an employee of the company?
   F mean
   G median
   H mode
   J range
29 The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. Which of the following statements is true?

![Scatter plot]

A A line of best fit can be drawn from the origin with a slope going upward to the right.
B A line of best fit can be drawn vertically from an expenditure of $1500.
C A line of best fit can be drawn horizontally from a sales of $125,000.
D The data has no correlation, so a line of best fit cannot be drawn.

30 The frequency table below shows the test scores for Mr. Cortez’s English class. What is the relative frequency for a test score of 81–90%?

<table>
<thead>
<tr>
<th>Test Scores</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91–100</td>
<td>HHH</td>
<td>6</td>
</tr>
<tr>
<td>81–90</td>
<td>HHH</td>
<td>8</td>
</tr>
<tr>
<td>71–80</td>
<td>HHH</td>
<td>5</td>
</tr>
<tr>
<td>61–70</td>
<td>HHH</td>
<td>3</td>
</tr>
</tbody>
</table>

F $\frac{3}{11}$  
G $\frac{3}{10}$  
H $\frac{4}{11}$  
J $\frac{2}{5}$
## Placement Test

### Geometry

Student Name __________________________

For each part, mark the box under the number of correctly answered questions.

<table>
<thead>
<tr>
<th>Domain</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpreting Functions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Reasoning with Equations and Inequalities</td>
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<tr>
<td>Linear, Quadratic, and Exponential Models</td>
<td></td>
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<tr>
<td>Seeing Structures in Expressions</td>
<td></td>
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<tr>
<td>Creating Equations</td>
<td></td>
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<tr>
<td>Interpreting Categorical and Quantitative Data</td>
<td></td>
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</tbody>
</table>

Mark the total number correct below.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>29</th>
<th>30</th>
</tr>
</thead>
</table>

**Key: Consider this student for...**

- [ ] Glencoe Algebra 1
- [ ] Geometry Strategic Intervention—See page 133 for materials list.
- [ ] Glencoe Geometry
<table>
<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpreting Functions</td>
<td></td>
<td>1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Graph linear and quadratic functions and show intercepts, maxima, and minima.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Graph linear and quadratic functions and show intercepts, maxima, and minima.</td>
</tr>
<tr>
<td>Reasoning with Equations and Inequalities</td>
<td></td>
<td>11. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</td>
</tr>
<tr>
<td>Domain</td>
<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Reasoning with Equations and Inequalities</strong></td>
<td>16</td>
<td>Graph the solutions to a linear inequality in two variables as a half-plane.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Solve quadratic equations in one variable.</td>
</tr>
<tr>
<td><strong>Linear, Quadratic, and Exponential Models</strong></td>
<td>21</td>
<td>Distinguish between situations that can be modeled with linear functions and with exponential functions.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</td>
</tr>
<tr>
<td><strong>Seeing Structure In Expressions</strong></td>
<td>23</td>
<td>Interpret expressions that represent a quantity in terms of its context.</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</td>
</tr>
<tr>
<td><strong>Creating Equations</strong></td>
<td>25</td>
<td>Graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td><strong>The Real Number System</strong></td>
<td>29</td>
<td>Rewrite expressions involving radicals and rational exponents using the properties of exponents.</td>
</tr>
<tr>
<td><strong>Interpreting Categorical &amp; Quantitative Data</strong></td>
<td>30</td>
<td>Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</td>
</tr>
</tbody>
</table>
A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.
Find these materials at www.connectED.mcgraw-hill.com.

<table>
<thead>
<tr>
<th>Study Guide and Intervention Masters</th>
<th>A brief explanation, along with examples and exercises, for every lesson in the Student Edition and included in the Chapter Resource Masters</th>
</tr>
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<tbody>
<tr>
<td>Skills Practice Masters</td>
<td>Additional practice in computational and application exercises for each lesson in the Student Edition and included in the Chapter Resource Masters</td>
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<tr>
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### Additional Print Materials

<table>
<thead>
<tr>
<th>Study Guide and Intervention Workbook</th>
<th>Consumable version of the Study Guide and Intervention Masters for each lesson.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Practice Workbook</td>
<td>Consumable version of the Practice Masters for each lesson.</td>
</tr>
</tbody>
</table>

### Additional Technology

<table>
<thead>
<tr>
<th>ExamView® Assessment Suite</th>
<th>Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records</th>
</tr>
</thead>
</table>
## Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CAPACITY AND VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilometer = 1000 meters</td>
<td>1 liter = 1000 milliliters</td>
</tr>
<tr>
<td>1 meter = 100 centimeters</td>
<td></td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td></td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 mile = 1760 yards</td>
<td>1 gallon = 4 quarts</td>
</tr>
<tr>
<td>1 mile = 5280 feet</td>
<td>1 gallon = 128 fluid ounces</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td></td>
<td>1 cup = 8 ounces</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilogram = 1000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 ton = 2000 pounds</td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td></td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
</tbody>
</table>
# Mathematics Chart

## PERIMETER
- **rectangle**
  \[ P = 2\ell + 2w \] or \[ P = 2(\ell + w) \]

## AREA
- **rectangle**
  \[ A = \ell w \] or \[ A = bh \]
- **triangle**
  \[ A = \frac{1}{2} bh \] or \[ A = \frac{bh}{2} \]
- **trapezoid**
  \[ A = \frac{1}{2} (b_1 + b_2)h \] or \[ A = \frac{(b_1 + b_2)h}{2} \]
- **regular polygon**
  \[ A = \frac{1}{2} aP \]
- **circle**
  \[ A = \pi r^2 \]

## CIRCUMFERENCE
- **circle**
  \[ C = 2\pi r \] or \[ C = \pi d \]

## SURFACE AREA
- **cube**
  \[ S = 6s^2 \]
- **prism (lateral)**
  \[ S = Ph \]
- **prism (total)**
  \[ S = Ph + 2B \]
- **pyramid (lateral)**
  \[ S = \frac{1}{2} P\ell \]
- **pyramid (total)**
  \[ S = \frac{1}{2} P\ell + B \]
- **cylinder (lateral)**
  \[ S = 2\pi rh \]
- **cylinder (total)**
  \[ S = 2\pi rh + 2\pi r^2 \] or \[ S = 2\pi rh + 2\pi r^2 \]
- **cone (lateral)**
  \[ S = \pi r\ell \]
- **cone (total)**
  \[ S = \pi r\ell + \pi r^2 \] or \[ S = \pi r(\ell + r) \]
- **sphere**
  \[ S = 4\pi r^2 \]

## VOLUME
- **prism or cylinder**
  \[ V = Bh \]
- **pyramid or cone**
  \[ V = \frac{1}{3} Bh \]
- **sphere**
  \[ V = \frac{4}{3} \pi r^3 \]

## SPECIAL RIGHT TRIANGLES
- **30°, 60°, 90°**
  \[ x, x\sqrt{3}, 2x \]
- **45°, 45°, 90°**
  \[ x, x, x\sqrt{2} \]

## PYTHAGOREAN THEOREM
\[ a^2 + b^2 = c^2 \]

## DISTANCE FORMULA
\[ d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]

## SLOPE OF A LINE
\[ m = \frac{y_2 - y_1}{x_2 - x_1} \]

## MIDPOINT FORMULA
\[ M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \]

## QUADRATIC FORMULA
\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

## SLOPE-INTERCEPT FORM OF AN EQUATION
\[ y = mx + b \]

## POINT-SLOPE FORM OF AN EQUATION
\[ y - y_1 = m(x - x_1) \]

## STANDARD FORM OF AN EQUATION
\[ Ax + By = C \]

## SIMPLE INTEREST FORMULA
\[ I = prt \]
Diagnostic and Placement
Geometry

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Carla earns $9 per hour working at a clothing store. She is writing a function to show the relationship between her hours worked \( h \), and her wages earned \( w \). In Carla’s function, what does the independent variable represent?
   - A the number of hours worked
   - B the wage earned in one hour
   - C the total wages earned
   - D the amount of time Carla must work to earn $1

2. Which statement describes each ordered pair \((x, y)\) in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>-2</td>
<td>2</td>
<td>14</td>
<td>34</td>
</tr>
</tbody>
</table>

   - F \( y \) is 2 less than \( x \).
   - G \( y \) is equal to \( x \).
   - H \( y \) is 2 less than twice \( x \).
   - J \( y \) is 2 less than the square of \( x \).

3. Which function describes the data in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

   - A \( y = x + 3 \)
   - B \( y = 2x + 3 \)
   - C \( y = 3x \)
   - D \( y = 3x - 1 \)

4. What is the domain of the function \( f(x) = \frac{3}{x + 2} \)?

   - F the set of all real numbers
   - G the set of all real numbers except \( x = -2 \)
   - H the set of all real numbers except \( x = 0 \)
   - J the set of all real numbers except \( x = 2 \)
5 The table below defines a linear function. What is the slope of the line?

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>-2</td>
<td>-5</td>
</tr>
<tr>
<td>-4</td>
<td>-9</td>
</tr>
</tbody>
</table>

A \( \frac{1}{2} \)  
B 2  
C \( \frac{7}{4} \)  
D \( \frac{11}{5} \)

6 Which statement is NOT true for the graph below?

- F The \( x \)-intercept is 1.  
- H The slope is \( \frac{1}{2} \).  
- G The \( y \)-intercept is \( \frac{1}{2} \).  
- J The line contains the origin.

7 A student graphed the line \( y = 3x + 2 \) plotting and connecting points A, B, and C. How can the student use points A, B, and C to find the graph of \( y = 3x - 5 \)?

- A Move each point down 5 units.  
- B Move each point down 7 units.  
- C Move each point left 3 units.  
- D Move each point right 7 units.

8 What is the range of the function \( f(x) = 3x^2 - 7 \)?

- F \( y \geq 7 \)  
- G \( y \leq 7 \)  
- H \( y \geq -7 \)  
- J \( y \leq -7 \)
9 The graph of \( y = ax^2 \) and \( y = bx^2 \) are shown below. Which statement describes the relationship between \( a \) and \( b \)?

A \( a = b \)
B \( a > b \)
C \( a < b \)
D There is not enough information to determine the relationship.

10 The graph of \( y = 2x^2 \) is shown below.

Which of the following shows the graph of \( y = 2x^2 - 4 \)?

F

H

G

J
11 The health club charges a $75 membership fee plus a $40 monthly fee. Wesley has $300 to spend on a health club membership. Which inequality can be used to find $m$, the number of months for which Wesley can afford to be a member of the health club?

A  $300 \geq 75 + 40m$
B  $300 \leq 75m + 40$
C  $300 \leq 75 + 40m$
D  $300 \geq 75m + 40$

12 The number of cars sold in May $m$ was 60 less than four times the number of cars sold in April $a$. Which equation shows the relationship between $m$ and $a$?

F  $m = a - 60$
G  $m = 60 - 4a$
H  $m = a^4 - 60$
J  $m = 4a - 60$

13 The graph below shows several ordered pairs for a linear function.

Which is the best prediction of the value of $y$ when $x$ is 7?

A  $-1.5$
B  $-2$
C  $-2.5$
D  $-3.5$

14 Solve for $x$.
$12 - 14x = -72$

F  $-36$
G  $-6$
H  $36$
J  $6$
The graph shows part of the line $y = -\frac{1}{2}x + b$. What is the value of $b$?

A $-\frac{1}{2}$  
B 2  
C 3  
D 6

In which graph does the shaded area show the solutions to the inequality $3x - 2y \leq -6$?

F  
H  
G  
J

Which is NOT a reasonable solution to the inequality $2x \geq x$?

A $x = -1$  
B $x = 0$  
C $x = 1$  
D $x = 2$
18. Molly has $5.20 in dimes and quarters. The number of dimes is 3 more than the number of quarters. Which system of linear equations can be used to find \( d \), the number of dimes, and \( q \), the number of quarters?

- **F** \[ 3q + d = 5.20 \]
- **G** \[ q + d = 0.35 \]
- **H** \[ 0.10d + 0.25q = 5.20 \]
- **J** \[ (q + 3) + q = 5.20 \]

19. Which shows the solution set of the following system of inequalities?

\[
\begin{align*}
x - y &\leq -1 \\
x + 2y &< 0
\end{align*}
\]

- **A**

20. What are the solutions to the equation \( 2x^2 + 9x = 5 \)?

- **F** \( x = -1, x = \frac{5}{2} \)
- **G** \( x = 1, x = -\frac{5}{2} \)
- **H** \( x = 5, x = -\frac{1}{2} \)
- **J** \( x = -5, x = \frac{1}{2} \)
21 Which of these shows the graphs of $y = x$ and $y = x^2$?

A

B

C

D

22 Which relationship is best shown by the graph?

23 Which algebraic expression represents the phrase “6 less than the sum of $x$ and the square of $x$?”

A $x + x^2 - 6$

B $x + \sqrt{x} - 6$

C $6 - x + x^2$

D $6 - (x + x^2)$

24 Which expression is equivalent to $-3(8 - 10)$?

F $-24 - 30$

G $-24 - 10$

H $-24 + 30$

J $24 - 30$
25. What is the equation of the line shown?

A. \( y = -2x + 4 \)
B. \( y = 4x - 2 \)
C. \( y = -2x - 4 \)
D. \( y = 4x + 2 \)

26. Which is an equation of the line that has a slope of \(-\frac{1}{3}\) and passes through the point \((-5, 2)\)?

F. \( x - 3y = -11 \)
G. \( x - 3y = 11 \)
H. \( x + 3y = 1 \)
J. \( x + 3y = 21 \)

27. The weight of an object on the moon varies directly as its weight on earth. The constant of variation is 6. Which equation describes this relationship?

A. \( y = 6x \)
B. \( y = x + 6 \)
C. \( xy = 6 \)
D. \( x + y = 6 \)

28. Adam bought CDs for $18 each and T-shirts for $11 each. Altogether, he spent $105. Which equation best represents Adam's purchase?

F. \( 4c + 3t = 105 \)
G. \( 18c + 11t = 105 \)
H. \( 29ct = 105 \)
J. \( (18 + 11)(c + t) = 105 \)

29. Simplify \( \sqrt[3]{\frac{a^2 b^2}{a^3 b^4}} \).

A. \( a^{\frac{1}{3}}b^{\frac{1}{2}} \)
B. \( a^{\frac{2}{3}}b^{10} \)
C. \( \frac{1}{ab^3} \)
D. \( \frac{1}{a^2 b^3} \)

30. Which relationship would most likely have a negative correlation?

F. the time elapsed, and the number of words typed
G. the temperature outside, and the number of people wearing coats
H. the number of students in a school, and the number of teachers in the school
J. the rate at which a car is driven, and the number of miles driven in one hour
For each part, mark the box under the number of correctly answered questions.

Mark the total number correct below.

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |

Key: Consider this student for...

- Glencoe Geometry
- Algebra 2 Strategic Intervention—See page 148 for materials list.
- Glencoe Algebra 2
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<thead>
<tr>
<th>Domain</th>
<th>Question Number</th>
<th>Objective</th>
</tr>
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<tbody>
<tr>
<td>Creating Equations</td>
<td>1</td>
<td>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</td>
</tr>
<tr>
<td>Seeing Structure in Expressions</td>
<td>4</td>
<td>Interpret expressions that represent a quantity in terms of its context.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Use the structure of an expression to identify ways to rewrite it.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Interpret expressions that represent a quantity in terms of its context.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Interpret expressions that represent a quantity in terms of its context.</td>
</tr>
<tr>
<td>Interpreting Functions</td>
<td>8</td>
<td>Graph linear and quadratic functions and show intercepts, maxima, and minima.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities.</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</td>
</tr>
<tr>
<td>Reasoning with Equations and Inequalities</td>
<td>12</td>
<td>Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Solve quadratic equations in one variable.</td>
</tr>
<tr>
<td>Similarity, Right Triangles, and Trigonometry</td>
<td>15</td>
<td>Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</td>
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<tr>
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<td>Question Number</td>
<td>Objective</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Geometric Measurement and Dimension</td>
<td>□ 18</td>
<td>Identify the shapes of two-dimensional cross-sections of three-dimensional objects.</td>
</tr>
<tr>
<td></td>
<td>□ 19</td>
<td>Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</td>
</tr>
<tr>
<td></td>
<td>□ 20</td>
<td>Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</td>
</tr>
<tr>
<td>Modeling with Geometry</td>
<td>□ 21</td>
<td>Use geometric shapes, their measures, and their properties to describe objects.</td>
</tr>
<tr>
<td></td>
<td>□ 22</td>
<td>Apply geometric methods to solve design problems.</td>
</tr>
<tr>
<td>Expressing Geometric Properties with Equations</td>
<td>□ 23</td>
<td>Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.</td>
</tr>
<tr>
<td></td>
<td>□ 24</td>
<td>Find the point on a directed line segment between two given points that partitions the segment in a given ratio.</td>
</tr>
<tr>
<td></td>
<td>□ 25</td>
<td>Derive the equation of a circle of given center and radius using the Pythagorean Theorem.</td>
</tr>
<tr>
<td>Circles</td>
<td>□ 26</td>
<td>Derive the formula for the area of a sector.</td>
</tr>
<tr>
<td></td>
<td>□ 27</td>
<td>Construct the inscribed and circumscribed circles of a triangle.</td>
</tr>
<tr>
<td>Congruence</td>
<td>□ 28</td>
<td>Specify a sequence of transformations that will carry a given figure onto another.</td>
</tr>
<tr>
<td></td>
<td>□ 29</td>
<td>Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.</td>
</tr>
<tr>
<td></td>
<td>□ 30</td>
<td>Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure.</td>
</tr>
</tbody>
</table>
### A Special Note About Intervention

When using diagnostic tests, teachers should always question the reason behind the students’ scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.

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<thead>
<tr>
<th>Student Performance Level</th>
<th>Number of Questions Correct</th>
<th>Suggestions for Intervention and Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Intervention</td>
<td>0–17</td>
<td>Use <em>Glencoe Geometry</em> to accelerate the achievement of students who are below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.</td>
</tr>
<tr>
<td>Strategic Intervention</td>
<td>18–23</td>
<td>Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the <em>Glencoe Algebra 2</em> program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.</td>
</tr>
<tr>
<td>Algebra 2</td>
<td>24 or more</td>
<td>Use <em>Glencoe Algebra 2</em>. This student does not require overall intervention. However, based on the student’s performance on the different sections, intervention may be required. For example, a student who missed 1 or more questions in the Interpreting Functions section may require extra assistance as you cover these skills throughout the year.</td>
</tr>
</tbody>
</table>
**Intervention/Remediation Materials**

Algebra 2

*Find these materials at www.connectEd.mcgraw-hill.com.*

<table>
<thead>
<tr>
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<th>Materials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Guide and Intervention Workbook</td>
<td>Consumable version of the Study Guide and Intervention Masters for each lesson.</td>
</tr>
<tr>
<td>Homework Practice Workbook</td>
<td>Consumable version of the Practice Masters for each lesson.</td>
</tr>
</tbody>
</table>

**Additional Technology**

<table>
<thead>
<tr>
<th>Materials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExamView® Assessment Suite</td>
<td>Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records</td>
</tr>
</tbody>
</table>
## Mathematics Chart

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CAPACITY AND VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilometer = 1000 meters</td>
<td>1 liter = 1000 milliliters</td>
</tr>
<tr>
<td>1 meter = 100 centimeters</td>
<td></td>
</tr>
<tr>
<td>1 centimeter = 10 millimeters</td>
<td></td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 mile = 1760 yards</td>
<td>1 gallon = 4 quarts</td>
</tr>
<tr>
<td>1 mile = 5280 feet</td>
<td>1 gallon = 128 fluid ounces</td>
</tr>
<tr>
<td>1 yard = 3 feet</td>
<td>1 quart = 2 pints</td>
</tr>
<tr>
<td>1 foot = 12 inches</td>
<td>1 pint = 2 cups</td>
</tr>
<tr>
<td></td>
<td>1 cup = 8 ounces</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MASS AND WEIGHT</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>1 kilogram = 1000 grams</td>
<td>1 year = 365 days</td>
</tr>
<tr>
<td>1 gram = 1000 milligrams</td>
<td>1 year = 12 months</td>
</tr>
<tr>
<td></td>
<td>1 year = 52 weeks</td>
</tr>
<tr>
<td><strong>Customary</strong></td>
<td><strong>Customary</strong></td>
</tr>
<tr>
<td>1 ton = 2000 pounds</td>
<td>1 week = 7 days</td>
</tr>
<tr>
<td>1 pound = 16 ounces</td>
<td>1 day = 24 hours</td>
</tr>
<tr>
<td></td>
<td>1 hour = 60 minutes</td>
</tr>
<tr>
<td></td>
<td>1 minute = 60 seconds</td>
</tr>
</tbody>
</table>
### Mathematics Chart

#### PERIMETER
<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>rectangle</td>
<td>$P = 2\ell + 2w$ or $P = 2(\ell + w)$</td>
</tr>
</tbody>
</table>

#### CIRCUMFERENCE
<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>circle</td>
<td>$C = 2\pi r$ or $C = \pi d$</td>
</tr>
</tbody>
</table>

#### AREA
<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>rectangle</td>
<td>$A = \ell w$ or $A = bh$</td>
</tr>
<tr>
<td>triangle</td>
<td>$A = \frac{1}{2} bh$ or $A = \frac{bh}{2}$</td>
</tr>
<tr>
<td>trapezoid</td>
<td>$A = \frac{1}{2} (b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$</td>
</tr>
<tr>
<td>regular polygon</td>
<td>$A = \frac{1}{2} aP$</td>
</tr>
<tr>
<td>circle</td>
<td>$A = \pi r^2$</td>
</tr>
</tbody>
</table>

$B$ represents the area of the base of a solid figure.

$P$ represents the Perimeter of the Base of a three-dimensional figure.

#### SURFACE AREA
<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>cube (total)</td>
<td>$S = 6s^2$</td>
</tr>
<tr>
<td>prism (lateral)</td>
<td>$S = Ph$</td>
</tr>
<tr>
<td>prism (total)</td>
<td>$S = Ph + 2B$</td>
</tr>
<tr>
<td>pyramid (lateral)</td>
<td>$S = \frac{1}{2}P\ell$</td>
</tr>
<tr>
<td>pyramid (total)</td>
<td>$S = \frac{1}{2}P\ell + B$</td>
</tr>
<tr>
<td>cylinder (lateral)</td>
<td>$S = 2\pi rh$</td>
</tr>
<tr>
<td>cylinder (total)</td>
<td>$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$</td>
</tr>
<tr>
<td>cone (lateral)</td>
<td>$S = \pi r\ell$</td>
</tr>
<tr>
<td>cone (total)</td>
<td>$S = \pi r\ell + \pi r^2$ or $S = \pi r(\ell + r)$</td>
</tr>
<tr>
<td>sphere</td>
<td>$S = 4\pi r^2$</td>
</tr>
</tbody>
</table>

#### VOLUME
<table>
<thead>
<tr>
<th>Shape</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>prism or cylinder</td>
<td>$V = Bh$</td>
</tr>
<tr>
<td>pyramid or cone</td>
<td>$V = \frac{1}{3} Bh$</td>
</tr>
<tr>
<td>sphere</td>
<td>$V = \frac{4}{3} \pi r^3$</td>
</tr>
</tbody>
</table>

#### SPECIAL RIGHT TRIANGLES
<table>
<thead>
<tr>
<th>Angles</th>
<th>Side Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>$30^\circ, 60^\circ, 90^\circ$</td>
<td>$x, x\sqrt{3}, 2x$</td>
</tr>
<tr>
<td>$45^\circ, 45^\circ, 90^\circ$</td>
<td>$x, x, x\sqrt{2}$</td>
</tr>
</tbody>
</table>

#### PYTHAGOREAN THEOREM
$a^2 + b^2 = c^2$

#### DISTANCE FORMULA
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

#### SLOPE OF A LINE
$m = \frac{y_2 - y_1}{x_2 - x_1}$

#### MIDPOINT FORMULA
$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

#### QUADRATIC FORMULA
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

#### SLOPE-INTERCEPT FORM OF AN EQUATION
$y = mx + b$

#### POINT-SLOPE FORM OF AN EQUATION
$y - y_1 = m(x - x_1)$

#### STANDARD FORM OF AN EQUATION
$Ax + By = C$

#### SIMPLE INTEREST FORMULA
$I = prt$
Diagnostic and Placement Algebra 2

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. The total cost \( c \) of buying \( b \) cans of beans can be found using the equation \( c = 0.79b \). What is represented by the dependent variable?
   - A The total cost of \( b \) cans
   - B The cost of 1 can
   - C The number of cans purchased
   - D The number of cans that can be purchased for $0.79

2. Which equation describes the functional relationship shown in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>(-2)</th>
<th>(-1)</th>
<th>(0)</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>(-6)</td>
<td>(-3)</td>
<td>(0)</td>
<td>(-3)</td>
<td>(-6)</td>
</tr>
</tbody>
</table>

- F \( f(x) = 3|x| \)
- G \( f(x) = 3|-x| \)
- H \( f(x) = |-3x| \)
- J \( f(x) = -|3x| \)

3. Which is an equation of the line that has a slope of \( \frac{1}{2} \) and passes through the point \((3, -1)\)?
   - A \( x + 2y = 1 \)
   - B \( x + 2y = -1 \)
   - C \( x - 2y = 5 \)
   - D \( x - 2y = 8 \)

4. A certain oak tree is 12 feet taller than a certain pine tree. If the pine tree is \( p \) feet tall, which expression represents the height of the oak tree?
   - F \( 12 + p \)
   - G \( 12 - p \)
   - H \( p - 12 \)
   - J \( 12p \)

5. Simplify the expression \( 4(2x - 1) - 3(x + 5) \).
   - A \( 3x - 19 \)
   - B \( 5x - 16 \)
   - C \( 5x - 19 \)
   - D \( 9x - 2 \)
6. The table below shows the number of diagonals in certain polygons. Which expression describes the number of diagonals in a polygon with \( n \) sides?

<table>
<thead>
<tr>
<th>Number of Sides</th>
<th>Number of Diagonals</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
</tr>
</tbody>
</table>

\[ F \quad n(n - 3) \quad G \quad \frac{n(n - 3)}{2} \quad H \quad \frac{(n-3)}{2} \quad J \quad \frac{n}{2} \]

7. The table below shows the sum of the interior angle measures of certain polygons. According to the information in the table, which is the best prediction of the sum of the interior angle measures in an 11-gon?

<table>
<thead>
<tr>
<th>Number of Sides</th>
<th>Sum of Interior Angle Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>180°</td>
</tr>
<tr>
<td>4</td>
<td>360°</td>
</tr>
<tr>
<td>5</td>
<td>540°</td>
</tr>
<tr>
<td>6</td>
<td>720°</td>
</tr>
</tbody>
</table>

\[ A \quad 900° \quad B \quad 1260° \quad C \quad 1440° \quad D \quad 1620° \]

8. Which shows the graph of \( y = x^2 \)?

\[ F \quad G \quad H \quad J \]
9. What is the slope of a line that passes through \((4, -1)\) and \((2, 9)\)?

- **A** \(\frac{3}{7}\)
- **B** \(-\frac{5}{7}\)
- **C** \(-5\)
- **D** \(-4\)

10. What is the \(x\)-intercept of the graph of \(3x - 4y = 12\)?

- **F** \(-4\)
- **G** \(-3\)
- **H** \(3\)
- **J** \(4\)

11. What is the range of the function \(f(x) = x^2 + 6x + 9\)?

- **A** all real numbers
- **B** all real numbers greater than or equal to 0
- **C** all real numbers greater than or equal to 3
- **D** all real numbers greater than or equal to 9

12. Which of the following methods can be used to solve the linear equation \(3x - 2 = 9\)?

- **F** Graph \(y = 3x - 2\) and identify the \(x\)-intercept.
- **G** Graph \(y = 3x - 11\) and identify the \(x\)-intercept.
- **H** Graph \(y = 3x - 2\) and identify the \(y\)-intercept.
- **J** Graph \(y = 3x - 11\) and identify the \(y\)-intercept.

13. The sum of two numbers is 27. The larger number is 6 more than twice the smaller number. Which system of equations can be used to find the two numbers?

- **A** \(xy = 27\)
  \(y = 6 + x\)
- **B** \(x + y = 27\)
  \(y = 6 + x\)
- **C** \(x + y = 27\)
  \(y = 6 + 2x\)
- **D** \(xy = 27\)
  \(y = 6 + 2x\)
14 What are the solutions of the equation $x^2 - 3x - 1 = 0$?

F $\frac{-3 + \sqrt{5}}{2}$ and $\frac{-3 - \sqrt{5}}{2}$

G $\frac{-3 + \sqrt{13}}{2}$ and $\frac{-3 - \sqrt{13}}{2}$

H $\frac{3 + \sqrt{5}}{2}$ and $\frac{3 - \sqrt{5}}{2}$

J $\frac{3 + \sqrt{13}}{2}$ and $\frac{3 - \sqrt{13}}{2}$

15 Eleanor has a garden in the shape of a right isosceles triangle. Two sides of the triangle measure 10 feet long each. What is the length of the third side?

A 20 feet

B $10 \sqrt{3}$ feet

C 15 feet

D $10 \sqrt{2}$ feet

16 A triangle undergoes an enlargement as shown in the diagram below. What is $x$?

F 36

G 37

H 41

J 56.25
17 For the right triangle shown below, what is the tangent of $\angle A$?

![Right triangle]

A $\tan A = \frac{3}{4}$
B $\tan A = \frac{4}{5}$
C $\tan A = \frac{5}{4}$
D $\tan A = \frac{4}{3}$

18 A plane intersects a right cylinder parallel to one of the cylinder's bases. What is the shape of the intersection?

F circle
G rectangle
H ellipse
J trapezoid

19 The volume of a cone is given by the formula $V = \frac{1}{3}\pi r^2h$. What is the volume of the cone below, to the nearest whole number? Use 3.14 for $\pi$.

A 100 cubic inches
B 126 cubic inches
C 301 cubic inches
D 377 cubic inches
A scientist has two similar cylindrical beakers. Beaker A has radius 6 centimeters. Beaker B has radius 3 centimeters. Which answer correctly completes the statement?

The volume of Beaker A is_______ times the volume of Beaker B.

F \( \sqrt{2} \)

G 2

H 2^2

J 2^3

Which figure has the views shown?

Top | Front | Side
--- | --- | ---
[ ] | [ ] | [ ]

A

B

C

D
22 Ed needs to paint the front wall on the building shown below. What is the area of the wall?

F  216 square feet  H  244 square feet
G  234 square feet  J  260 square feet

23 The line \( y = mx + 7 \) is perpendicular to the line \( y = \frac{3}{4}x - 9 \). What is \( m \)?

A  \( \frac{3}{4} \)  C  \( \frac{4}{3} \)
B  \( -\frac{3}{4} \)  D  \( -\frac{4}{3} \)

24 In the right triangle below, \( M \) is the midpoint of hypotenuse \( QR \).

Which expression represents the distance from point \( P \) to point \( M \)?

F  \( \left( \frac{a + c}{2} \right) + \left( \frac{d + b}{2} \right) \)
G  \( \sqrt{\left( \frac{a + c}{2} \right)^2 + \left( \frac{d + b}{2} \right)^2} \)
H  \( \left( \frac{c - a}{2} \right) + \left( \frac{d - b}{2} \right) \)
J  \( \sqrt{\left( \frac{c - a}{2} \right)^2 + \left( \frac{d - b}{2} \right)^2} \)
25 A circle has its center at \((4, -2)\) and has a radius of 3. What is the equation of the circle?

- **A** \((x - 4)^2 + (y - 2)^2 = 9\)
- **B** \((x - 4)^2 + (y + 2)^2 = 9\)
- **C** \((x - 4)^2 + (y - 2)^2 = 3\)
- **D** \((x - 4)^2 + (y + 2)^2 = 3\)

26 For the circle below, which expression can be used to find the area of the shaded region?

![Circle with angle 120° and radius 8 cm]

- **F** \(\frac{1}{3} \cdot 16\pi\)
- **G** \(\frac{2}{3} \cdot 16\pi\)
- **H** \(\frac{1}{3} \cdot 64\pi\)
- **J** \(\frac{2}{3} \cdot 64\pi\)

27 The radius of the circle below is 5 centimeters. Line segment \(AB\) is a diameter of the circle. What is the value of \(x\) to the nearest tenth?

![Circle with line segment AB and radius 5 cm]

- **A** 6.7
- **B** 7.3
- **C** 8.9
- **D** 9.5
28 Which single transformation is shown below?

F Translation  
G Reflection  
H Rotation  
J Dilation

29 Based on the information in the diagram, which triangle congruence property can be used to justify that $\triangle ABC \cong \triangle FGH$?

A SSS (If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.)  
B SAS (If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.)  
C ASA (If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.)  
D AAS (If two angles and a side of one triangle are congruent to two angles and a side of another triangle, then the triangles are congruent).

30 Triangle $ABC$ has coordinates $A(0, 6), B(3, 0), \text{ and } C(4, 3)$. Triangle $ABC$ is reflected across the $x$-axis. What are the coordinates of $C'$?

F $(-3, 4)$  
H $(-4, 3)$  
G $(3, 4)$  
J $(4, -3)$
Diagnostic and Placement Tests  
Grade K  

This test contains 15 questions. Work each problem in the space on this page. Select the best answer. Write the answer as directed.

1. Count the apples. Write the number. __________

2. Put an X on the set of four cherries.

3. Look at the animals below. Circle the animal that is shown more.

4. Circle the problem that fits the story.  
   2 + 1 = 3
   
   2
   1
   
   2
   + 1
   3

5. How many more squares do you need to have ten squares in all? 6 squares

6. Milla has 2 apples. Sam has 3 apples. How many apples do they have together? 5

7. What number is shown below? 15

8. Circle the cubes below that show how to make 12.

9. Circle the shorter object.

10. Circle the object that holds more.
11 Sort the crayons by color. Use tally marks to show how many crayons are in each group.

<table>
<thead>
<tr>
<th>Number of Crayons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crayons</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

12 Look at the group. Write how many of each pet.

<table>
<thead>
<tr>
<th>Our Favorite Pets</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13 Put an X on the objects that can stack.

14 Put an X on the sailboat that is in the middle.

15 Put an X on the crayon that is under the table.
Diagnostic and Placement Tests
Grade 1

This test contains 15 questions. Work each problem in the space on this page. Select the best answer. Circle the correct answer.

1. The number of hearts is _______ the number of triangles.
   - more than
   - less than
   - equal to

2. How many diamonds?
   - ◊◊◊◊◊
   - ◊◊◊◊◊◊
   - ◊◊◊◊◊◊

   16  17  18  19

3. What number comes after 39?
   - 37
   - 38
   - 40
   - 41

4. Which sign makes the number sentence 43 _______ 43 true?
   - =
   - +
   - -
   - ?

5. What number is modeled below?
   - 10
   - 27
   - 23
   - 37

6. Write a number sentence that shows how many hats Maria bought in all.

   3 + 2 = 5 hats
7. What number makes the number sentence true?
   \[3 + 6 = \square + 3\]
   \[3 \quad 4 \quad 5 \quad 6\]

8. Circle the number sentence that is true.
   \[7 = 3 + 5\]
   \[8 = 2 + 6\]

9. Which picture shows a cookie split into 2 equal parts?
   ![Cookie options]

10. Which set of words best describes the shape?
    - triangle, 3 sides
    - square, 4 equal sides
    - rectangle, 4 sides
    - circle, 0 sides

11. Circle the shape that has 4 equal sides.
    ![Shape options]

12. The triangles below can be combined to form which shape?
    ![Triangle options]

13. Circle the longer object.
    ![Object options]
14 Look at the group. Write how many of each pet.

Our Favorite Pets

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td>4</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

15 List the items from longest to shortest.

- crayon
- pencil
- marker

crayon, pencil, marker
pencil, marker, crayon
marker, pencil, crayon
crayon, marker, pencil

Diagnostic and Placement Tests
Grade 2

Name ____________________
Date ____________________

This test contains 15 questions. Work each problem in the space on this page. Circle the best answer.

1. Which sign makes the number sentence $245 \bigcirc 268$ true?
   - $=$
   - $>$
   - $<$
   - $+$

2. Which number sentence is true?
   - $325 + 100 = 525$
   - $325 - 10 = 315$
   - $325 - 100 = 305$
   - $325 + 10 = 345$

3. A number has three ones, two tens, and seven hundreds. What is the number?
   - $275$
   - $723$
   - $725$
   - $732$
4. Ruthie cut 8 triangles and 5 squares out of construction paper. Which number sentence tells how many more triangles than squares Ruthie cut?

\[8 - 5 = 3\]
\[8 - 3 = 5\]
\[5 - 8 = 3\]
\[5 + 8 = 13\]

5. The second grade students ate 8 pizzas. The first grade students ate 6 pizzas. Which number sentence tells how many pizzas they ate in all?

\[8 + 6 = 14\]
\[4 + 3 = 7\]
\[8 - 6 = 2\]
\[4 - 3 = 1\]

6. Circle the number sentence that shows how many hearts in all.

\[5 + 5 = 10\]
\[2 + 2 + 2 + 2 = 8\]
\[4 + 4 = 8\]

7. What time is shown on the clock?

\[2:30\]
\[3:30\]
\[6:15\]
\[7:15\]

8. Mykia has 2 dimes, 3 nickels and 4 pennies. How much money does she have?

\[$0.39\]
\[$0.34\]
\[$0.29\]
\[$0.24\]

9. Estimate the length of the crayon in inches. About how long is the crayon?

\[5\text{ inches}\]
\[4\text{ inches}\]
\[3\text{ inches}\]
\[2\text{ inches}\]
10 Tanya and Marcell asked their friends which pet is their favorite. The results are shown below.

Our Favorite Pets

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many more chose dogs than cats?

1   2   3   4

11 The class voted on their favorite fruits. The results are shown below. How many more students chose bananas than apples?

Favorite Fruits

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bananas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apples</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12 Which object has two faces that are triangles?

- [ ]

13 Which solid figure has a face that is a circle?

- [ ]

14 How many more sides does a pentagon have than a triangle?

3   2   4   5

15 Isaiah, Carson, and Julia cut a pizza into three equal sections. Each one of them ate one section of the pizza. How much of the pizza did each one eat?

- a half
- a third
- a fourth
- a whole
1. Round the number shown below to the nearest 10.
   - A 50
   - B 60
   - C 70
   - D 80
   1. C

2. Find the sum of 1,245 and 2,360.
   - F 2,505
   - G 3,505
   - H 3,595
   - J 3,605
   2. J

3. TaLeah and two of her friends each have 20 stretchy bracelets. How many bracelets do they have in all?
   - A 40
   - B 60
   - C 80
   - D 90
   3. B

4. Which number sentences is true?
   - F $4 \times 20 = 60$
   - G $4 \times 30 = 90$
   - H $8 \times 20 = 100$
   - J $5 \times 30 = 150$
   4. J

5. Each student has 8 marbles. Who has the greatest fraction of black marbles?
   - A Pilar
   - B Bob
   - C Cathy
   - D Donte
   5. C

6. Which pizza is more than half eaten?
   - F
   - G
   - H
   - J
   6. F

7. What number is located at Point A on the number line below?
   - A $\frac{1}{4}$
   - B $\frac{1}{3}$
   - C $\frac{1}{2}$
   - D $\frac{2}{3}$
   7. B
8. What fraction of the students chose apples as their favorite fruit?

<table>
<thead>
<tr>
<th>Favorite Fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
</tr>
<tr>
<td>Bananas</td>
</tr>
<tr>
<td>Apples</td>
</tr>
</tbody>
</table>

F 4/17  G 6/17  H 7/17  J 1/2

F 4 __ 17  G 6 __ 17  H 7 __ 17  J 1 __ 2

9. Julia places 3 yellow, 4 red, 1 green, and 2 purple candies in a bag. What candy color are 1/10 of the candies?

A yellow  B purple  C red  D green

10. Which fraction is equivalent to 2/5?

F 1/3  G 4/10  H 4/7  J 6/10

11. Ms. Anna gave each of her 5 dance students 6 stickers at the end of dance class. Which can be used to find how many stickers she passed out in all?

A 5 x 6  B 5 + 6  C 6 - 5  D 7 x 5

12. Sam, Liana, Frank and Terrell went fishing. Each person caught four fish. How many fish were caught all together?

F 8  G 4  H 12  J 16

13. A teacher had 20 pieces of chalk. He wanted to give each of his 5 students the same number of pieces. How many pieces of chalk should he give each student?

A 5  B 6  C 4  D 2

14. Fumiko has 35 soccer cards to pass out. He splits them equally among 5 friends. Which number sentence shows how many soccer cards he gave each friend?

F 35 ÷ 5 = 7  G 35 - 5 = 30
H 35 ÷ 6 = 5  J 35 - 10 = 25

15. What is the missing number?

30, 32, 34, __, 38, 40, 42
A 33  B 35  C 36  D 37

16. Which of these can be used to check the answer to the problem below?

40 ÷ 5 = 8

F 4 x 10 = 40  G 2 x 20 = 40
H 10 + 10 + 20 = 40  J 5 x 8 = 40
17 Look at the pattern in the table.

| Starfish | 1 | 2 | 3 | 4 |
| Points   | 5 | 10| 15| ? |

How many points do 4 starfish have?
A 16  B 20  C 25  D 30

18 Onatah noticed wagons have 4 wheels. Which table could she use to determine the number of wheels on four of these wagons?
F
| Wagons | 1 | 2 | 3 | 4 |
| Wheels | 4 | 6 | 8 | 10 |

G
| Wagons | 1 | 2 | 3 | 4 |
| Wheels | 4 | 8 | 12| 16 |

H
| Wagons | 1 | 2 | 3 | 4 |
| Wheels | 4 | 8 | 16| 20 |

J
| Wagons | 1 | 2 | 3 | 4 |
| Wheels | 4 | 8 | 16| 32 |

19 How many more CDs does Charles have than Stan?

<table>
<thead>
<tr>
<th>Number of CDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles</td>
</tr>
<tr>
<td>Alonso</td>
</tr>
<tr>
<td>Sareeta</td>
</tr>
<tr>
<td>Stan</td>
</tr>
</tbody>
</table>

A 3  B 5  C 30  D 20

20 Look at the clocks. How long does the ballet class last?

Start
10:00
End
11:00

F a half hour  H an hour and a half
G an hour  J two hours

21 Each apple weighs 6 ounces. How many 1-ounce weights need to be added to the scale to make it balanced?

A  B  C  D

A  B  C  D

A  B  C  D

A  B  C  D
22 Estimate the length of the crayon to the nearest half inch.

F 1 1/2 inches  G 2 1/2 inches  H 3 1/2 inches  J 4 1/2 inches

23 Find the area of the rectangle.

A 8 square units  B 9 square units  C 10 square units  D 12 square units

24 A rectangle has one side that measures 6 feet and the other side measures 4 feet. Which of these cannot be used to find the area of the rectangle?

F 6 + 6 + 6 + 6
G 4 × 6
H 6 × 4
J 6 + 4

25 Franco got home from school at 3:40. Fifteen minutes later he went outside to play. What time did he go outside to play?

A 3:45  B 3:50  C 3:55  D 4:00

26 Find the perimeter of the rectangle.

F 6 units  G 8 units  H 10 units  J 12 units

27 Look at the two triangles. Which of the following shapes could be made from the two triangles?

A  □  B  □  C  △  D  ◊

28 What statement is true about the two figures?

F Both figures are rectangles.
G Both figures are quadrilaterals.
H Both figures have the same area.
J Both figures are the same.

29 Which of the following shapes does not have four sides?

A square  B rectangle  C rhombus  D triangle

30 Sophie cut an orange into four equal sections. She ate one of the sections. How much of the orange did she eat?

F 1/4  G 1/3  H 1/2  J 3/4
Diagnostic and Placement

Grade 4

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Which set of numbers is in order from least to greatest?
   A 4324, 4432, 4234, 4234
   B 4332, 4324, 4243, 4234
   C 4243, 4324, 4324, 4432
   D 4234, 4243, 4324, 4432

2. To enter a dog show, Tehya must weigh her Great Dane and record his weight rounded to the nearest ten pounds. Tehya's Great Dane weighs 123 pounds. Which weight should Tehya record for the dog show?
   F 100 pounds
   G 120 pounds
   H 125 pounds
   J 130 pounds

3. Find the unknown.
   \[ 458 \times 7 = x \]
   A 465
   B 2,856
   C 3,204
   D 3,206

4. Which symbol makes the number sentence true?
   \[ 27,543 \quad \quad 27,343 \]
   F >
   G <
   H =
   J +

5. Find the unknown.
   \[ 328 \div 6 = y \]
   A 54 R4
   B 54 R2
   C 56
   D 56 R4

6. Marley makes an apple pie and a blueberry pie to serve at Thanksgiving dinner. After dessert, she notices that \( \frac{3}{8} \) of the apple pie remains and \( \frac{1}{4} \) of the blueberry pie remains. Which statement is TRUE concerning Marley's observation?
   F More apple pie remained than blueberry pie because \( \frac{3}{8} > \frac{1}{4} \).
   G More blueberry pie remained than apple pie because \( \frac{3}{8} > \frac{1}{4} \).
   H More apple pie was eaten than blueberry pie because \( \frac{3}{8} < \frac{1}{4} \).
   J Both pies had the same amount remaining because \( \frac{3}{8} = \frac{1}{4} \).
7. What fraction is not equivalent to the fraction of cows in the group of animals?

A. $\frac{2}{5}$  
B. $\frac{4}{10}$  
C. $\frac{6}{15}$  
D. $\frac{4}{5}$  

8. Identify a fraction equivalent to the fraction shown on the number line.

F. $\frac{1}{3}$  
H. $\frac{3}{4}$  
G. $\frac{4}{6}$  
J. $\frac{7}{8}$  

9. Which of the following numbers is the greatest?

A. 11.6  
B. 2.09  
C. 4.63  
D. 1.17  

10. Which point could represent 1.65?

F. Point P  
G. Point Q  
H. Point R  
J. Point S  

11. On Field Day, Camille hopped on one foot around $\frac{2}{5}$ of the track. Payton hopped on one foot around $\frac{1}{5}$ of the track. Together, how far did they hop around the track on one foot?

A. $\frac{1}{5}$  
B. $\frac{2}{5}$  
C. $\frac{3}{5}$  
D. $\frac{4}{5}$  

12. Which of the following number sentences is true about $\frac{8}{5}$?

F. $\frac{1}{8} + \frac{1}{8} = \frac{8}{5}$  
H. $\frac{1}{5} \times \frac{1}{8} = \frac{8}{5}$  
G. $5 \times \frac{1}{8} = \frac{8}{5}$  
J. $8 \times \frac{1}{5} = \frac{8}{5}$  

13. Jordan buys twenty-four gumballs at the candy store. On the way home, he chews six gumballs and gives three to his sister. How many gumballs does Jordan have left when he gets home?

A. 13  
B. 14  
C. 15  
D. 16  

14. Which signs go in the boxes to make the number sentence true?

F. $\div$; +  
G. $-$; +  
H. $\div$; $\times$  
J. $-$; $\times$  

42 $\square$ 7 $\square$ 5 = 11
15 Drew owns 4 sheets of stickers. Each sheet has 12 stickers. Which number sentence does not show how to find the total number of stickers Drew owns?

A  12 + 4 =  
B  12 + 12 + 12 + 12 =  
C  12 × 4 =  
D  4 × 12 =  

16 Heather and Matt both collect rocks. Heather says that she has thirty-two rocks in her collection. Matt says that he has three times as many rocks as Heather does. Which number sentence could Heather use to find the number of rocks in Matt's collection?

F  32 + 3  
H  32 × 3  
G  32 - 3  
J  32 ÷ 3  

17 The table below shows the number of crayons in each box. If every box has the same number of crayons, how many crayons will be in 8 boxes?

<table>
<thead>
<tr>
<th>Number of Boxes</th>
<th>Number of Crayons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
</tbody>
</table>

A  8  
B  32  
C  64  
D  72  

18 A line of ants is moving across Denise's picnic blanket. She counts 6 legs on the first ant, 12 legs on the first two ants, and 18 legs on the first three ants. If Denise continues to count, how many legs will she count on the first 12 ants?

F  24 legs  
G  56 legs  
H  60 legs  
J  72 legs  

19 Which factor pair does not belong to 36?

A  1, 36  
C  6, 6  
B  2, 12  
D  4, 9  

20 Hector saves $5.00 of his allowance every week. After 12 weeks he has $60.00 saved. Which table could he use to show the amount of money he will save after 20 weeks?

F  | Week | Money Saved |
---|------|-------------|
15 |  $65.00  |
16 |  $70.00  |
17 |  $75.00  |
18 |  $80.00  |
19 |  $85.00  |
20 |  $90.00  |

H  | Week | Money Saved |
---|------|-------------|
15 |  $75.00  |
16 |  $80.00  |
17 |  $85.00  |
18 |  $90.00  |
19 |  $95.00  |
20 |  $100.00 |

G  | Week | Money Saved |
---|------|-------------|
15 |  $70.00  |
16 |  $75.00  |
17 |  $80.00  |
18 |  $85.00  |
19 |  $90.00  |
20 |  $95.00  |

J  | Week | Money Saved |
---|------|-------------|
15 |  $80.00  |
16 |  $85.00  |
17 |  $90.00  |
18 |  $95.00  |
19 |  $100.00 |
20 |  $105.00 |
21 Bianca is building a tower with wooden blocks. She counts the number of blocks on each level and records it in the chart below.

<table>
<thead>
<tr>
<th>Level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocks</td>
<td>20</td>
<td>16</td>
<td>12</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Which statement describes the number of blocks on each level of her tower?
A Bianca adds 4 blocks with every level of the tower.
B Bianca adds 6 blocks with every level of the tower.
C Bianca subtracts 6 blocks with every level of the tower.
D Bianca subtracts 4 blocks with every level of the tower.

22 Kiyoshi has three quarters, five dimes, and one nickel in her piggy bank. Identify Kiyoshi’s total amount of money and the operation used to calculate it.

F $1.10, addition
G $1.10, subtraction
H $1.30, addition
J $1.30, subtraction

23 Measure the length of the ribbon in centimeters. About how long is the ribbon?

A 8 centimeters
B 9 centimeters
C 10 centimeters
D 11 centimeters

24 A classroom is shaped like a rectangle with a length of 30 feet and a width of 24 feet.

What is the perimeter in feet of the classroom?
F 54 feet
G 84 feet
H 108 feet
J 720 feet

25 What is the area of this figure?

A 4 square units
B 6 square units
C 7 square units
D 8 square units
26. Sam's baseball practice starts at 3:15. His practice is $1 \frac{1}{2}$ hours long. What time does his practice end?

- F angle 1
- H angle 2
- G angle 3
- J angle 4

27. How many lines of symmetry are there in the figure below?

- A 0
- B 1
- C 5
- D 10

28. Look at the four angles marked on the picture of a bicycle.

Which angle appears to be a right angle?

- F angle 1
- H angle 3
- G angle 2
- J angle 4

29. The polygon below has two right angles.

Which side of the polygon is parallel to side $\overline{AB}$?

- A $\overline{BC}$
- B $\overline{CD}$
- C $\overline{DE}$
- D $\overline{EA}$

30. Bella drew an angle that measured 105°. What type of angle did she draw?

- F right
- H obtuse
- G acute
- J straight
Diagnostic and Placement Tests
Grade 5

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. What decimal is equivalent to \(\frac{3}{4}\)?
   \[\begin{array}{l}
   A \ 0.25 \\
   B \ 0.34 \\
   C \ 0.75 \\
   D \ 1.33
   \end{array}\]

2. Find the product of 6.1 and 4.9.
   \[\begin{array}{l}
   F \ 7.93 \\
   G \ 11.0 \\
   H \ 29.89 \\
   J \ 30.79
   \end{array}\]

3. Look at the table below. Which of the following has NOT been rounded correctly to the nearest hundred?

<table>
<thead>
<tr>
<th>City</th>
<th>Exact Population</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>690,252</td>
<td>690,300</td>
</tr>
<tr>
<td>Chicago</td>
<td>3,844,829</td>
<td>3,844,800</td>
</tr>
<tr>
<td>Seattle</td>
<td>557,087</td>
<td>557,100</td>
</tr>
<tr>
<td>St. Louis</td>
<td>912,332</td>
<td>912,330</td>
</tr>
</tbody>
</table>

   Source: U.S. Census Bureau

   A Chicago  C Seattle  B Austin  D St. Louis

4. The number 13.76 is read as which of the following:
   \[\begin{array}{l}
   F \ \text{thirteen and seventy-six tenths} \\
   G \ \text{thirteen and seventy-six hundredths} \\
   H \ \text{thirteen and seventy-six thousandths} \\
   J \ \text{thirteen thousand and seventy-six}
   \end{array}\]

5. Raven is asked to check the answer to the multiplication problem below. Which number sentence could she use to check her answer?

   \[23 \times 452 = 10,396\]

   \[\begin{array}{l}
   A \ 23 + 452 = 475 \\
   B \ 452 - 23 = 429 \\
   C \ 10,396 \times 23 = 452 \\
   D \ 10,396 \div 23 = 452
   \end{array}\]
### 6 How can you write 10,000,000 using exponents?
- F $10^4$
- H $10^6$
- G $10^5$
- J $10^7$

### 7 Inali ate $\frac{3}{5}$ of a pizza. His friend ate $\frac{1}{4}$ of the pizza. How much did they eat all together?
- A $\frac{1}{3}$
- B $\frac{1}{2}$
- C $\frac{5}{8}$
- D $\frac{3}{4}$

### 8 Josh, Avi, and Charlotte each sold slices of pie at the bake sale. The figures below show how they each cut their pie. The shaded parts represent the pieces they sold. What can you conclude from the data?
- F Josh and Avi sold $1\frac{1}{2}$ pies.
- G Avi and Charlotte sold $1\frac{1}{2}$ pies.
- H Avi and Charlotte each sold the same amount of pie.
- J Charlotte and Josh sold $1\frac{3}{10}$ pies.

### 9 Sasha’s mom bought a container with 150 bracelet beads for Sasha’s birthday party. There were 8 girls at the birthday party to equally share the beads. Between what two amounts of beads should each girl receive?
- A between 15 and 16
- B between 16 and 17
- C between 17 and 18
- D between 18 and 19

### 10 Which of the following expressions is equal to $\frac{3}{4} \times 7$?
- F $4 \div 5 + 7$
- G $4 \times 7 \div 5$
- H $4 \times 7 \times 5$
- J $5 \div 4 \times 7$

### 11 Adam spins a spinner 12 times. The results are shown in the bar graph below. Which fraction of the spins were red or blue?
- A $\frac{2}{3}$
- B $\frac{3}{4}$
- C $\frac{7}{12}$
- D $\frac{5}{6}$
12 A salsa recipe calls for $\frac{1}{3}$ cup of onions. William wants to multiply the recipe by 4. How many cups of onion will he need?

- $\frac{3}{4}$ cup
- 1 cup
- $1\frac{1}{3}$ cups
- $1\frac{2}{3}$ cups

13 The menu below shows the prices at Lunchtime Café. Lucita orders a turkey sandwich and two fruit cups. What expression should she use to determine the cost of her meal?

<table>
<thead>
<tr>
<th>Lunchtime Cafe</th>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey Sandwich</td>
<td>$4.50</td>
<td></td>
</tr>
<tr>
<td>Ham Sandwich</td>
<td>$4.35</td>
<td></td>
</tr>
<tr>
<td>Salad</td>
<td>$2.10</td>
<td></td>
</tr>
<tr>
<td>Fruit Cup</td>
<td>$2.50</td>
<td></td>
</tr>
<tr>
<td>Juice</td>
<td>$1.90</td>
<td></td>
</tr>
</tbody>
</table>

A $4.50 + (2 \times 2.50)$
B $4.50 + 2.50$
C $2.50 + (2 \times 4.50)$
D $2.50 \times 4.50$

14 Each student in fifth grade donates 4 cans of food to the food bank. There are 285 fifth-grade students. Which of the following shows the number of cans donated and the correct justification for the number?

- 71 because 285 divided by 4 is approximately 71
- 289 because 285 plus 4 is 289
- 1,120 because 280 times 4 is 1,120
- 1,140 because 285 times 4 is 1,140

15 Mr. Izquierdo is joining a gym. There is a $150 registration fee and a monthly fee of $28. Which expression shows the total cost for Mr. Izquierdo to join the gym for a year?

A $(150 + 28) \times 12$
B $150 \times (28 + 12)$
C $(150 \times 12) + 28$
D $150 + (28 \times 12)$

16 Each week, Melanie saves the same amount of money. After the third week, she has $30. After the fifth week, she has $50. After the seventh week, she has $70. Which operation could Melanie use to determine the amount she will have saved by the tenth week?

- Add 10 to the number of weeks.
- Add 20 to the numbers of weeks.
- Multiply 10 times the number of weeks.
- Multiply 20 times the number of weeks.

17 Carmen created the following table of multiplication facts for 100. If the pattern continues, what is $100 \times 12$?

<table>
<thead>
<tr>
<th>#</th>
<th>$\times 100$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
</tr>
</tbody>
</table>

A 120  B 210  C 1,200  D 2,100
18 Bennett created the table below. Which operation did he perform on the numbers in the left column to find the numbers in the right column?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

\( \text{F} \) Add 8. \( \text{H} \) Multiply by 8. \\
\( \text{G} \) Add 9. \( \text{J} \) Multiply by 9.

19 Martin notices that certain pickup trucks have 6 wheels. Which table could he use to determine the number of wheels on five of these pickup trucks?

\( \text{A} \) Trucks | 1 | 2 | 3 | 4 | 5 | Wheels | 4 | 8 | 12 | 16 | 20
\( \text{B} \) Trucks | 1 | 2 | 3 | 4 | 5 | Wheels | 6 | 12 | 18 | 24 | 30
\( \text{C} \) Trucks | 1 | 2 | 3 | 4 | 5 | Wheels | 4 | 16 | 64 | 256 | 1024
\( \text{D} \) Trucks | 1 | 2 | 3 | 4 | 5 | Wheels | 6 | 36 | 216 | 1296 | 7776

18 F

19 B

20 Tamera is 4 years younger than her brother. Which expression could you use to determine Tamera's age, given her brother's age \( b \)?

\( \text{F} \) \( b + 4 \) \( \text{H} \) \( b \times 4 \) \\
\( \text{G} \) \( b - 4 \) \( \text{J} \) \( b + 4 \)

20 G

21 Use a ruler to measure the length of the rectangle below in centimeters. Convert this length to meters.

\( \text{A} \) 8 m \( \text{B} \) 0.8 m \( \text{C} \) 0.08 m \( \text{D} \) 0.008 m

21 C

22 There are 12 inches in 1 foot, and there are 3 feet in 1 yard. How many inches are there in 1 yard?

\( \text{F} \) 12 \( \text{H} \) 36 \\
\( \text{G} \) 24 \( \text{J} \) 48

22 H

23 Megan wants to estimate the volume of the box shown below. Which is the best estimate? \( (V = l \times w \times h) \)

\( \text{A} \) 50 \( \text{B} \) 60 \( \text{C} \) 100 \( \text{D} \) 110

23 C
24 What is the volume of the figure?

- F 10 cubic units
- G 12 cubic units
- H 14 cubic units
- J 16 cubic units

25 Which of the following is equal to 4 gallons?

- A 1 quart
- B 8 quarts
- C 12 quarts
- D 16 quarts

26 A rectangular shoebox is 14 inches long by 8 inches wide by 6 inches tall. What is the volume of the shoebox?

- F 28 cubic inches
- G 668 cubic inches
- H 480 cubic inches
- J 672 cubic inches

27 Look at the coordinate grid below. Which point is located at (2, 5)?

- A Point A
- B Point B
- C Point C
- D Point D

28 On the graph below, ∆ABC is graphed. What is the x-coordinate of point A?

- F 3
- G 4
- H 5
- J 6

29 Which of the following does not describe the figure below?

- A square
- B rectangle
- C quadrilateral
- D trapezoid

30 Which best describes this figure?

- F pentagon
- G hexagon
- H triangle
- J octagon
Diagnostic and Placement Tests
Grade 6

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. The table below shows the length of the hiking trails at a local park. Aaron hikes half of the blue trail. What distance did he hike?

<table>
<thead>
<tr>
<th>Hiking Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Blue</td>
</tr>
<tr>
<td>Green</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
</tbody>
</table>

A 0.5 mile  B 0.93 mile  C 1.86 miles  D 3.72 miles

2. Candace is knitting a scarf. The scarf is 4.6 feet long. If she knits another 1.75 feet, how long will the scarf be?

F 6.35 feet  G 5.81 feet  H 5.35 feet  J 2.85 feet

3. Ms. Ayala had 152 pencils. She divided the number of pencils equally among 13 students. She kept the leftover pencils in her desk. What is the greatest number of pencils Ms. Ayala could have given each student?

A 9  B 10  C 11  D 12

4. Kono divides the numerator and denominator of \( \frac{\text{58}}{70} \) by the greatest common factor to simplify the fraction in one step. By what number does he divide?

F 2  G 12  H 16  J 24

5. After January 1, Aleta has band practice every fourth day and swimming lessons every third day. If both programs end January 31, how many days in January will Aleta have both band practice and swimming lessons?

A 1 day  B 2 days  C 3 days  D 4 days

6. In simplest form, what is the quotient of \( \frac{1}{6} \div \frac{3}{7} \)?

F \( \frac{1}{7} \)  G \( \frac{9}{12} \)  H \( \frac{7}{24} \)  J \( \frac{3}{6} \)

7. Which sign makes the number sentence \(-8 \square -3\) true?

A \( > \)  B \( < \)  C \( = \)  D \( \geq \)

8. A triangle has sides measuring 3.54 inches, 5.12 inches, and 2.30 inches. Add to find the perimeter of the triangle.

F 10.69 inches  G 10.96 inches  H 11.06 inches  J 11.96 inches

9. For every 12 slices of pizza sold at Ping’s Pizza Shop, 3 slices are pepperoni, 4 are sausage, and the rest are cheese. What is the ratio of pepperoni to cheese?

A 3:12  B 3:5  C 3:4  D 5:3

10. Kara is training for a 5-kilometer race. On the first day of training, she runs 0.75 kilometer. What percent of the total distance does she run the first day of training?

F 5%  G 10%  H 15%  J 25%

11. A 4-pack of batteries costs $5.16. At this price, what is the cost of one battery?

A $1.29  B $1.49  C $5.16  D $20.64
12 The table shows the cost of ride tickets at the fair. What is the unit rate for one ride ticket?

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>$3.75</td>
</tr>
<tr>
<td>10</td>
<td>$7.50</td>
</tr>
<tr>
<td>15</td>
<td>$11.25</td>
</tr>
<tr>
<td>20</td>
<td>$15.00</td>
</tr>
</tbody>
</table>

F $0.37  G $0.55  H $0.70  J $0.75

13 Kali earned $40 for babysitting for 5 hours. At this rate, how much will she earn for babysitting for 7 hours?

A $8  B $45  C $47  D $56

14 Tia, Veronica, Pam, and Lily are sisters. Tia is 8 years old and she is 2 years older than Pam. Pam is 5 years younger than Veronica and Veronica is 4 years younger than Lily. Which list has the sisters in order from youngest to oldest?

F Tia, Veronica, Pam, Lily  G Lily, Veronica, Tia, Pam  H Tia, Pam, Veronica, Lily  J Pam, Tia, Veronica, Lily

15 The table below shows the cost for different numbers of tickets.

<table>
<thead>
<tr>
<th>Number of Tickets</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$12</td>
</tr>
<tr>
<td>4</td>
<td>$24</td>
</tr>
<tr>
<td>6</td>
<td>$36</td>
</tr>
<tr>
<td>8</td>
<td>$48</td>
</tr>
<tr>
<td>10</td>
<td>$60</td>
</tr>
</tbody>
</table>

Based on the information in the table, which of the following statements is true?

A Each ticket costs $2.
B Each ticket costs $6.
C The more tickets you buy the less each ticket costs.
D The more tickets you buy the greater each ticket costs.

16 Edmundo bought 4 trading cards yesterday. He bought some more trading cards today. Now he has 12 trading cards. If n represents the number of trading cards Edmundo bought today, which equation is correct?

F 4 + 12 = n  G 4 + n = 12  H n + 12 = 4  J n + 4 = 16

17 Which of the following expressions is equivalent to $7(x + 3)$?

A 10 + x  C 7x + 3
B 7x + 21  D 3x + 21

18 What is the solution to the equation $5 + b = 18$?

F $b = 5$  H $b = 13$
G $b = 8$  J $b = 23$

19 Miguel practiced more than 5 hours for his first soccer game. Which inequality represents $p$, the amount of time Miguel practiced?

A $p > 5$  C $p = 5$
B $p < 5$  D $p = 5$

20 A rectangular prism is shown below. What is the volume of the prism?

F $\frac{1}{2}$ yd$^3$  H $\frac{5}{24}$ yd$^3$
G $\frac{5}{4}$ yd$^3$  J $\frac{7}{12}$ yd$^3$

21 Look at the figure below.

What is the area of the figure?

A 12 cm$^2$  C 38 cm$^2$
B 32 cm$^2$  D 42 cm$^2$
22. Lanu draws a rectangle that is 10 inches wide and 20 inches long. Which rectangle described below has the same area?
   - F 5 inches wide and 25 inches long
   - G 8 inches wide and 25 inches long
   - H 15 inches wide and 15 inches long
   - J 15 inches wide and 25 inches long
   **G**

23. A box has a square base with each side measuring 8 inches. The height of the box is 4 inches. What is the surface area of the box in cubic inches?
   - A 96 square inches
   - B 192 square inches
   - C 256 square inches
   - D 612 square inches
   **C**

24. On the graph below, what is the length of side AB?
   - F 3 units
   - G 4 units
   - H 5 units
   - J 6 units
   **F**

25. Mrs. Brown has a flower garden in the shape of a parallelogram. The length of the base of the garden is 9.5 feet and the height is 4.2 feet. What is the area of the flower garden?
   - A 19.95 ft²
   - B 27.4 ft²
   - C 30.7 ft²
   - D 39.9 ft²
   **D**

26. Mrs. Esperanza’s math class is playing a game using two spinners. One spinner has the colors red, blue, and green. The other spinner has the numbers 1, 2, 3, 4, 5, 6, 7, and 8. How many possible outcomes are there?
   - F 11
   - G 16
   - H 21
   - J 24
   **J**

27. Trent has a math quiz every Friday. The table below shows his quiz scores. What is the mode of Trent’s scores?

<table>
<thead>
<tr>
<th>Quiz</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>97</td>
<td>88</td>
<td>78</td>
<td>77</td>
<td>82</td>
<td>57</td>
<td>88</td>
</tr>
</tbody>
</table>

   - A 97
   - B 88
   - C 82
   - D 81
   **B**

28. Kahlid spins a spinner 10 times. The results are shown in the tally chart below. Which of the following graphs show these results?

<table>
<thead>
<tr>
<th>Spin Results</th>
<th>Number of Spins</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>4</td>
</tr>
<tr>
<td>Red</td>
<td>6</td>
</tr>
<tr>
<td>Blue</td>
<td>0</td>
</tr>
</tbody>
</table>

   - F
   - G
   - H
   - J
   **F**

29. What is the median of these data?
   - 67, 98, 78, 75, 83, 44, 98
   - A 44
   - B 75
   - C 78
   - D 98
   **C**

30. The number of points Ming scored in each basketball game this season are shown below. What is the mean number of points she scored?

<table>
<thead>
<tr>
<th>3</th>
<th>7</th>
<th>1</th>
<th>8</th>
<th>2</th>
<th>4</th>
<th>9</th>
<th>10</th>
<th>8</th>
</tr>
</thead>
</table>

   - F 6
   - G 8
   - H 9
   - J 10
   **F**
Diagnostic and Placement Tests  
Grade 7

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Nate has 6 3/4 yards of fabric. He uses 3 1/2 yards of fabric to make a pillow. How much fabric does he have left?
   A 3 1/10 yards   B 3 1/2 yards   C 3 3/2 yards   D 4 1/10 yards

2. Olivia orders 4 ham sandwiches at the deli. The total amount was $30.52. How much did each sandwich cost?
   F $7.63   G $7.83   H $12.63   J $12.02

3. Mrs. Cheng has $18 deducted monthly from her checking account for her gym membership. What integer represents the change in her account for a year of gym membership?
   A -$18   B -$36   C -$180   D -$216

4. Find 3/8 x 4 1/2. Write in simplest form.
   F 9/16   G 2   H 2 1/6   J 4 1/15

5. On a map, 3 inches represent an actual distance of 42 miles. If the actual distance between two cities is 322 miles, how many inches apart will the two cities be on the map?
   A 8 inches   B 14 inches   C 23 inches   D 107 inches

6. Tyler earned $68 for babysitting 8 hours. If Tyler is paid the same rate, how much will he earn for babysitting 12 hours?
   F $8.50   H $102   G $80   J $816

7. Charlene bought her friends lunch. The bill came to $52.80 before Charlene added an 18% service tip. How much did she add for the service tip?
   A $4.75   C $9.50   B $5.70   D $10.20

8. The school band sold 200 tickets to their concert. If 90 of the tickets were adult tickets, what percent of the tickets sold were adult tickets?
   F 18%   H 55%   G 45%   J 90%

9. A car travels 528 miles on 16 gallons of gas. At the same rate, how many gallons of gas are needed to travel 165 miles?
   A 4   B 5   C 6   D 7

10. The table shows the cost of blueberries at a local farmer’s market. What is the unit price for one ounce of blueberries?

<table>
<thead>
<tr>
<th>Ounces</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>$1.80</td>
</tr>
<tr>
<td>12</td>
<td>$3.60</td>
</tr>
<tr>
<td>18</td>
<td>$5.40</td>
</tr>
</tbody>
</table>

   F $0.30 per ounce   H $0.60 per ounce   G $0.40 per ounce   J $1.80 per ounce

11. Which expression is equivalent to 5x + 2 – x + 10?
   A 4x + 12   C 4x – 8   B 6x + 12   D 6x – 8
12. A triangle has a height that is 5 units shorter than its base. If \( b \) represents the base and \( h \) represents the height, which of the following equations represent the area of the triangle?

- **F** \( A = \frac{1}{2}(b - 5) \)
- **H** \( A = \frac{1}{2}b(b - 5) \)
- **G** \( A = \frac{1}{2}(h - 5) \)
- **J** \( A = \frac{1}{2}(b - 5)h \)

13. Which equation shows the relationship between the \( x \) - and \( y \) -values in the table to the right?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

- **A** \( y = x - 2 \)
- **B** \( x = y + 2 \)
- **C** \( y = x + 2 \)
- **D** \( y = \frac{x}{2} \)

14. What is the solution to the equation \( 3t - 10 = 8? \)

- **F** \( t = 3 \)
- **G** \( t = 6 \)
- **H** \( t = 8 \)
- **J** \( t = 9 \)

15. Randy is playing a number game. Beginning with the number 8, he adds 4, multiplies by 5, and then divides by -10. He then subtracts 2. What number does he find at the end of the game?

- **A** -8
- **B** -6
- **C** 6
- **D** 8

16. The table below shows the charges for a taxi ride in a city. If a taxi ride is \( m \) miles, which expression can be used to find the total charge of the ride?

<table>
<thead>
<tr>
<th>Charges for Each Taxi Ride</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage Charge</td>
<td>$0.75 Each Mile</td>
</tr>
<tr>
<td>CityGas Tax</td>
<td>$0.10 Each Mile</td>
</tr>
<tr>
<td>Tourist Charge</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

- **F** \( 2.50m + 0.75 \)
- **H** \( 0.10m + 3.25 \)
- **G** \( 0.75m + 2.50 \)
- **J** \( 0.85m + 2.50 \)

17. Michael's age is 5 years younger than Jordan. Jordan is 4 years younger than Keanu. Keanu is 17 years old. How old is Michael?

- **A** Michael is 12 years old, because he is 5 years younger than Keanu.
- **B** Michael is 22 years old, because he is 5 years younger than Keanu.
- **C** Michael is 8 years old, because he is 5 years younger than Jordan, and Jordan is 13 years old.
- **D** Michael is 18 years old, because he is 5 years younger than Jordan, and Jordan is 13 years old.

18. Jeb's weight \( w \) is \( \frac{1}{3} \) of Iago's weight \( a \). Which equation could be used to find Jeb's weight?

- **F** \( w = a - \frac{1}{3} \)
- **G** \( w = \frac{1}{3}a \)
- **H** \( w = a - \frac{1}{3} \)
- **J** \( w = \frac{1}{3}a \)

19. An electrician charges $30 for a house visit and $55 for each hour of work. If Mrs. Firewalks was charged $222.50 for work, which can be used to find the number of hours that the electrician worked?

- **A** Subtract 55 from 222.50 and then divide the difference by 30.
- **B** Subtract 30 from 222.50 and then divide the difference by 55.
- **C** Divide 222.50 by 55.
- **D** Divide 222.50 by 30.

20. Diane draws an obtuse, isosceles triangle with one of the angles measuring 35°. What is the measure of the obtuse angle in her triangle?

- **F** 35°
- **G** 55°
- **H** 110°
- **J** 145°

21. The measure of \( \angle B \) in parallelogram \( ABCD \) is 75°. What is the measure of \( \angle A \)?

- **A** 75°
- **B** 105°
- **C** 150°
- **D** 210°
**22** The circumference of a circle is $20\pi$. What is the radius of this circle?

- **F** 2
- **G** 10
- **H** 20
- **J** 40

22 **G**

**23** Find the surface area of the composite figure below.

- **A** 184 in$^2$
- **B** 416 in$^2$
- **C** 744 in$^2$
- **D** 840 in$^2$

23 **C**

**24** Which of the following is closest to the measure of the angle shown below?

- **F** 50°
- **G** 80°
- **H** 130°
- **J** 180°

24 **H**

**25** The height of a box is 6 inches. The length of the box is 14 inches and the width of the box is 4 inches. Which equation could be used to find the surface area of the box?

- **A** $s = 2 \cdot (14 \cdot 6) + 2 \cdot (4 \cdot 6)$
- **B** $s = (14 \cdot 4) + (14 \cdot 6) + (6 \cdot 4)$
- **C** $s = 2 \cdot (14 \cdot 6) + 2 \cdot (14 \cdot 6) + 2 \cdot (6 \cdot 4)$
- **D** $s = (14 \cdot 4) \cdot (14 \cdot 6) \cdot (6 \cdot 4)$

25 **C**

**26** Booker has a bag of marbles. There are 10 blue marbles, 6 yellow marbles, and 4 red marbles. Booker reaches into the bag without looking and picks a marble. What is the probability that he picks a red marble?

- **F** $\frac{1}{3}$
- **G** $\frac{1}{4}$
- **H** $\frac{1}{5}$
- **J** $\frac{1}{20}$

26 **H**

**27** To win a prize, a player picks a door and then a box behind the door. There are 3 doors and 4 boxes behind each door. How many prizes can be won if each box has a different prize?

- **A** 3
- **B** 4
- **C** 7
- **D** 12

27 **D**

**28** There are 10 marbles in a bag: 1 blue, 4 yellow, 3 red, and 2 white. If you choose a marble at random, which is the probability that you will NOT choose white?

- **F** 20%
- **G** 25%
- **H** 75%
- **J** 80%

28 **J**

**29** Juan needs to choose an outfit from his closet. He can choose from a red, green, or blue T-shirt and he can choose from a pair of blue, tan, or black pants. Which table shows all possible outfits if Juan picked one shirt and one pair of pants at random?

- **A**
  - | Shirts | Pants |
  - | --- | --- |
  - | red blue | blue tan |
  - | green black | tan black |
  - | blue tan | blue tan |

- **B**
  - | Shirts | Pants |
  - | --- | --- |
  - | red blue | blue tan |
  - | green blue | tan black |
  - | blue tan | blue tan |

- **C**
  - | Shirts | Pants |
  - | --- | --- |
  - | red blue | blue tan |
  - | green black | tan black |
  - | blue tan | blue tan |

- **D**
  - | Shirts | Pants |
  - | --- | --- |
  - | red blue | blue tan |
  - | green black | tan black |
  - | blue tan | blue tan |

29 **B**

**30** A jar contains 4 green marbles, 2 pink marbles, and 3 striped marbles. One marble is picked at random and then replaced. Then another marble is drawn at random again. What is the probability that both marbles are striped?

- **F** $\frac{1}{81}$
- **H** $\frac{1}{3}$
- **G** $\frac{1}{9}$
- **J** $\frac{1}{2}$

30 **G**
Diagnostic and Placement Tests

Grade 8

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1 Which set of numbers is ordered from least to greatest?
   A $\frac{3}{8}; \frac{1}{2}; 1; \sqrt{2}; 4$
   B $\frac{3}{8}; \frac{1}{2}; \sqrt{2}; 1; 4$
   C $4; \sqrt{2}; 1; \frac{3}{2}; \frac{7}{8}$
   D $\frac{3}{2}; \sqrt{2}; 1; 4; \sqrt{2}$

2 The area of a square is 8 square meters. Which of these is closest to the length of one side of the square?
   F 2 meters
   G 2.8 meters
   J 4 meters
   H 3.5 meters

3 Which of the following sets of numbers does $\sqrt{49}$ NOT belong?
   A integer
   B real number
   C rational number
   D irrational number

The table shows circles and their corresponding diameters. Which of the following graphs show the correct relationship between the radius and the area of each circle?

4 The table shows circles and their corresponding diameters.

<table>
<thead>
<tr>
<th>Circles</th>
<th>Diameter (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R 2</td>
</tr>
<tr>
<td></td>
<td>S 4</td>
</tr>
<tr>
<td></td>
<td>T 8</td>
</tr>
<tr>
<td></td>
<td>U 12</td>
</tr>
</tbody>
</table>

5 The picture models the equation $5x + 2 = 3x + 6$. What value of $x$ makes the equation true?
   A $x = 1$
   B $x = 2$
   C $x = 4$
   D $x = 6$

6 In $\triangle ABC$, the measure of $\angle A$ is 33° and the measure of $\angle C$ is 90°. What is the measure of $\angle B$?
   F 17°
   G 57°
   H 137°
   J 147°
7. Light travels at a speed of about $2.998 \times 10^8$ meters per second. Express this number in standard notation.
   - A 299,800,000
   - B 0.0000002998
   - C 29,980,000
   - D 0.0002998

8. A thunderstorm cloud holds about 6,200,000,000 raindrops. Which of the following shows this number in scientific notation?
   - F $6.2 \times 10^9$
   - H $6.2 \times 10^8$
   - G $0.62 \times 10^9$
   - J $62.0 \times 10^8$

9. Which of the following is equivalent to the expression $4^4 \times 4^{-3}$?
   - A $\frac{1}{4}$
   - B $\frac{1}{4^2}$
   - C $4^{10}$
   - D $4^2$

10. What is true concerning the lines graphed by the system of equations shown below?
    - F The lines intersect.
    - H The lines are parallel.
    - G The lines are perpendicular.
    - J The lines are the same.

11. What is the solution of the equation?
    - A $x = \frac{3}{2}$
    - B $x = 2$
    - C $x = 6$
    - D $x = 36$

12. What function is represented in the table?
    - F $f(n) = n + 3$
    - H $f(n) = 4n + 2$
    - G $f(n) = 4n - 1$
    - J $f(n) = 3n - 2$

13. Mr. Wilson wrote the function $f(x) = 7x - 15$ on the chalkboard. What is the value of this function for $f(6)$?
    - A 27
    - B 37
    - C 42
    - D 57

14. On average, a dog runs 5.5 times faster than a child. Which function can be used to find the speed of a dog, given the speed of the child?
    - F $f(c) = 5.5c$
    - H $f(c) = c + 5.5$
    - G $f(c) = \frac{5.5}{c}$
    - J $f(c) = \frac{c}{5.5}$

15. What is the slope and y-intercept of the equation $6x - 1 = 3y - 10$?
    - A $m = 2, b = 3$
    - C $m = 3, b = 4$
    - B $m = 2, b = -3$
    - D $m = 6, b = 9$

16. Which best describes the graph of the function $f(x) = 4x$?
    - F A straight line through the origin with a steep slope downward to the right.
    - G A straight line through the origin with a steep slope upward to the right.
    - H A straight line through 4 on the x-axis with a slope downward to the right.
    - J A straight line through 4 on the y-axis with a slope upward to the right.

17. Which function described below has the greatest rate of change?
    - I $f(x) = 4x - 3$
    - II $f(x) = \frac{4x}{5}$
    - III $f(x) = 4x + 5$
    - A II
    - B III
    - C I
    - D They all have the same rate of change.

18. The delivery ramp at the Corner Café is a right triangle. The hypotenuse is 4 meters long. One leg is 3 meters long. What is the length of the other leg?
    - F $\sqrt{7}$ meters
    - H 3.5 meters
    - G $\sqrt{12}$ meters
    - J 5 meters
19 The map below shows where four of Nahimana’s friends live. Each unit on the map represents 1 mile.

About how far apart do Aesha and Josh live?
A about 5 mi  B about 6 mi  C about 7.5 mi  D about 8.5 mi

20 What is the volume of the cylinder shown below?

F 44 ft³  H 138.16 ft³  G 69.08 ft³  J 276.32 ft³

21 What is the difference in the volume of the two triangular prisms shown below?

A 32 cm³  C 1,675 cm³  B 158 cm³  D 3,350 cm³

22 A photo with a length of 3 inches and a width of 5 inches is enlarged to poster size. The poster and the photo are similar. The length of the poster is 21 inches. What is the width of the poster?

F 7.2 inches  H 19 inches  G 12.6 inches  J 35 inches

23 Rectangle ABCD is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle ABCD over the following: (x, y) → (x + 1, y – 2)?

A  B  C  D

24 A rectangle is cut along its diagonal. The measure of ∠A is 55°. What is the measure of ∠B?

F 125°  G 105°  H 45°  J 35°

25 A 26-foot rope is used to brace a tent pole at the county fair. The rope is anchored 10 feet from the box of the pole. How tall is the tent pole?

A 21.8 ft  B 24 ft  C 28 ft  D 30 ft
26. A cylindrical water tower is 24 feet high and has a diameter of 20 feet. Approximately how many cubic feet of water could the tower hold?

- **F** 2,400 cubic feet
- **G** 7,500 cubic feet
- **H** 9,600 cubic feet
- **J** 30,200 cubic feet

27. The triangles below are similar triangles. Find the value of x and y.

- **A** \(x = 6, y = 8\)
- **B** \(x = 3, y = 4\)
- **C** \(x = 1.5, y = 2\)
- **D** \(x = 12, y = 16\)

28. The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. What can be concluded from this data?

- **F** As advertising increases, sales tend to decrease.
- **G** As advertising increases, sales tend to increase.
- **H** As advertising increases, sales remain the same.
- **J** As advertising increases, sales always increase.

29. The box plot shows a set of test scores. Which statement is correct?

- **A** More students scored between 40 and 60 points than between 88 and 96 points.
- **B** An equal number of students scored from 40 to 60 as from 88 to 96.
- **C** The lowest score was 60.
- **D** The highest score was 88.

30. A survey is taken to determine which type of vehicle is most popular. The data is shown in the bar graph below. What can you conclude about the survey?

- **F** The survey is biased because most men do not favor sports vehicles.
- **G** The survey is biased because there are more men surveyed than women.
- **H** The survey is not biased because sports cars are most popular among both men and women.
- **J** The survey is not biased because all car types are favored by both men and women.
1. Jake goes to the grocery store and buys 3 apples, 2 cans of soup, and 1 box of cereal. The apples cost $0.89 each; the soup costs $2.98 per can; and the box of cereal costs $4.99. Write an equation that represents the total cost of Jake's purchases.

A) \( c = (3 \cdot 0.89) + (2 \cdot 2.98) + 4.99 \)
B) \( c = (3 + 0.89) \cdot (3 + 2.98) + 4.99 \)
C) \( c = (3 \cdot 0.89) + (2 \cdot 2.98) + 4.99 \)
D) \( c = (3 \cdot 0.89) \cdot (2 \cdot 2.98) \cdot 4.99 \)

2. Mr. Thomas wants to buy a boat. He must make 48 monthly payments to pay back the amount he borrowed, plus interest. His monthly payment is $161.85. What other information is necessary to determine the amount of money Mr. Thomas borrowed from the bank?

F) How much Mr. Thomas makes per month
G) The interest rate the bank charges
H) How much a boat license costs
J) How much the value of the boat will increase

3. Ricky jogs 5 laps around a track in 8 minutes. Which of the following would be the same number of laps per minute?

A) 7 laps in 9.6 minutes
B) 10 laps in 15.6 minutes
C) 12 laps in 19.2 minutes
D) 8 laps in 20 minutes

4. The planet Mercury is about \( 5.80 \times 10^7 \) kilometers from the Sun. Express this number in standard notation.

F) 0.00000058
G) 0.00000058
H) 5,800,000
J) 58,000,000

5. Which of the following is equivalent to the expression \( 8^{\frac{1}{3}} \times 8^3 \)?

A) \( \frac{1}{8} \)
B) \( \frac{1}{8^3} \)
C) \( 8^3 \)
D) \( 8^7 \)

6. What is the solution of the equation?

\[ \frac{2}{3} (y + 10) = 8 \]

F) \( y = -5 \)
G) \( y = 10 \)
H) \( y = 20 \)
J) \( y = 30 \)

7. What is the solution of the system of equations?

\[ \begin{align*}
    y &= 2x \\
    y &= x + 5 
\end{align*} \]

A) \((0, 5)\)
B) \((1, \frac{3}{2}, 6, \frac{2}{3})\)
C) \((2, 7)\)
D) \((5, 10)\)

8. Barb walked 1.3 miles to her friend's house and then \( \frac{5}{2} \) mile to the library. How far did Barb walk in all?

F) \(1 \frac{9}{40} \) miles
G) \(1 \frac{3}{7} \) miles
H) \(2 \frac{1}{20} \) miles
J) \(2 \frac{1}{10} \) miles

9. Which of the following sets of numbers does \( \sqrt{121} \) NOT belong?

A) integer
B) real number
C) rational number
D) irrational number

10. What is the decimal expansion of \( -\frac{113}{15} \)?

F) \(-0.73\)
G) \(-0.73\)
H) \(-0.7\)
J) \(-0.7\)

11. Between which two numbers on a number line does \( \sqrt{70} \) fall?

A) 6 and 7
B) 7 and 8
C) 8 and 9
D) 9 and 10
12. Which of the following sets of numbers is correctly ordered from least to greatest?
   F. 4.2, √16, 4 1/2, √18
   G. 4.2, √16, √18, 4 1/2
   H. √16, 4.2, 4 1/2, √18
   J. √16, 4.2, √18, 4 1/2

13. Which algebraic expression can be used to find the nth term in the following sequence?
   6, 10, 14, 18, 22, ...
   A. n + 4
   B. 6n + 4
   C. 6n
   D. 4n + 2

14. Which of the following is not a linear function?
   F. y = 1/3x - 2
   H. y = 2x^2
   G. y = 3x - 2
   J. y = -x + 1

15. Mrs. Junkin wrote the function f(x) = 2/3x - 5 on the chalkboard. What is the value of this function for f(6)?
   A. -1
   B. 1
   C. 7
   D. 9

16. Which best describes the graph of the function f(x) = -5x?
   F. A straight line through the origin with a steep slope upward to the right.
   G. A straight line through the origin with a steep slope downward to the right.
   H. A straight line through -5 on the x-axis with a slope downward to the right.
   J. A straight line through -5 on the y-axis with a slope upward to the right.

17. Which function described below has the greatest rate of change?
   I. f(x) = 5x + 7
   II. f(x) = 1/3x - 1
   III. x | f(x)
        1  | 4
        2  | 8
        3  | 12
        4  | 16
   A. I
   B. II
   C. III
   D. They all have the same rate of change.

18. What is the slope of the function described in the table below?
   x | y
   0 | -3
   2 | -2
   4 | -1
   6 | 0
   F. -3
   G. 1/2
   H. 2
   J. 3

19. Robin’s neighborhood is mapped out on the graph below. Each unit on the map represents 1 mile.
   About how far apart are the park and diner?
   A. about 4 miles
   B. about 5 miles
   C. about 6.4 miles
   D. about 10 miles
20 Jason is experimenting with different ramps to replace the stair step into his house. The table below shows the measure of a given angle $m$ and its complement.

<table>
<thead>
<tr>
<th>Measure of $\angle m$</th>
<th>Measure of $\angle m$'s Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>85°</td>
</tr>
<tr>
<td>15°</td>
<td>75°</td>
</tr>
<tr>
<td>25°</td>
<td>65°</td>
</tr>
<tr>
<td>35°</td>
<td>55°</td>
</tr>
<tr>
<td>45°</td>
<td>45°</td>
</tr>
</tbody>
</table>

Based on the table, which of the following statements is true?

- F  As the measure of $\angle m$ decreases, its complement decreases by 10 degrees.
- G  $\angle m$ and its complement form an acute angle.
- H  The sum of the measures of $\angle m$ and its complement is 90.
- J  Subtracting 45 from the measure of $\angle m$ will determine its complement.

21 The following figures are formed using a semicircle and a rectangle.

Based on this pattern, what will be the area of the next figure?

- A  266.625 cm$^2$ because the next figure will decrease in area by $\frac{1}{2}$ the previous figure.
- B  173.25 cm$^2$ because the next figure will decrease in area by 360 cm$^2$.
- C  353.25 cm$^2$ because the next figure will decrease in area by 180 cm$^2$.
- D  443.25 cm$^2$ because the next figure will decrease in area by 90 cm$^2$.

22 Rectangle $ABCD$ is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle $ABCD$ over the following: $(x, y) \rightarrow (x-2, y+1)$?

23 A photo with a length of 4 inches and a width of 6 inches is enlarged to fit in a large picture frame. The photo and the enlarged picture are similar. The length of the enlarged picture is 14 inches. What is the width of the enlarged picture?

- A  9.3 inches
- B  14 inches
- C  21 inches
- D  56 inches

24 The lengths of the sides of a right triangle are 9 centimeters and 40 centimeters. What is the length of the hypotenuse?

- F  31 centimeters
- H  49 centimeters
- G  41 centimeters
- J  81 centimeters
25 Which of the following represents the measures of the sides of a right triangle?

- A. 9 cm, 12 cm, 15 cm
- B. 6 cm, 7 cm, 8 cm
- C. 5 cm, 10 cm, 12 cm
- D. 7 cm, 12 cm, 13 cm

26 A cylindrical soup can has a radius of 4 centimeters and a height of 12 centimeters. What is the volume of the soup can to the nearest tenth?

- F. 150.8 cm³
- G. 192.0 cm³
- H. 301.4 cm³
- J. 603.2 cm³

27 Four cards numbered 1, 5, 8, and 9 are placed in a bag. A card is drawn at random and then replaced. Then a card is drawn at random again. What is the probability that both cards drawn have the number 9?

- A. \(\frac{1}{16}\)
- B. \(\frac{1}{9}\)
- C. \(\frac{1}{4}\)
- D. \(\frac{1}{2}\)

28 A company has five employees. Their annual earnings, in dollars, are shown below.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24,000</td>
<td>24,000</td>
<td>28,000</td>
<td>30,000</td>
<td>125,000</td>
</tr>
</tbody>
</table>

Which of the following measures best represents the typical annual earnings of an employee of the company?

- F. mean
- G. median
- H. mode
- J. range

29 The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. Which of the following statements is true?

- A. A line of best fit can be drawn from the origin with a slope going upward to the right.
- B. A line of best fit can be drawn vertically from an expenditure of $1500.
- C. A line of best fit can be drawn horizontally from a sales of $125,000.
- D. The data has no correlation, so a line of best fit cannot be drawn.
Diagnostic and Placement Tests

Geometry

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1. Carla earns $9 per hour working at a clothing store. She is writing a function to show the relationship between her hours worked, \( h \), and her wages earned, \( w \). In Carla’s function, what does the independent variable represent?
   A) the number of hours worked
   B) the wage earned in one hour
   C) the total wages earned
   D) the amount of time Carla must work to earn $1

2. Which statement describes each ordered pair \((x, y)\) in the table?

   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   0 & 2 \\
   2 & 4 \\
   4 & 8 \\
   6 & 14 \\
   \end{array}
   \]
   F) \( y \) is 2 less than \( x \).
   H) \( y \) is 2 less than twice \( x \).
   G) \( y \) is equal to \( x \).
   J) \( y \) is 2 less than the square of \( x \).

3. Which function describes the data in the table?

   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   0 & 3 \\
   1 & 5 \\
   2 & 7 \\
   3 & 9 \\
   \end{array}
   \]
   A) \( y = x + 3 \)
   C) \( y = 3x \)
   B) \( y = 2x + 3 \)
   D) \( y = 3x - 1 \)

4. What is the domain of the function \( f(x) = \frac{3}{x+2} \)?
   F) the set of all real numbers
   G) the set of all real numbers except \( x = -2 \)
   H) the set of all real numbers except \( x = 0 \)
   J) the set of all real numbers except \( x = 2 \)

5. The table below defines a linear function. What is the slope of the line?

   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   4 & 7 \\
   2 & 3 \\
   0 & -1 \\
   -2 & -5 \\
   -4 & -9 \\
   \end{array}
   \]
   A) \( \frac{1}{2} \)
   B) 2
   C) \( \frac{7}{4} \)
   D) \( \frac{11}{5} \)

6. Which statement is NOT true for the graph below?

   F) The \( x \)-intercept is 1.
   H) The slope is \( \frac{1}{2} \).
   G) The \( y \)-intercept is \( \frac{2}{3} \).
   J) The line contains the origin.

7. A student graphed the line \( y = 3x + 2 \) plotting and connecting points \( A, B, \) and \( C \). How can the student use points \( A, B, \) and \( C \) to find the graph of \( y = 3x - 7 \)?
   A) Move each point down 5 units.
   B) Move each point down 7 units.
   C) Move each point left 3 units.
   D) Move each point right 7 units.

8. What is the range of the function \( f(x) = 3x^2 - 7 \)?
   F) \( y \geq 7 \)
   G) \( y = 7 \)
   H) \( y \geq -7 \)
   J) \( y \leq -7 \)
9. The graph of \( y = ax^2 \) and \( y = bx^2 \) are shown below. Which statement describes the relationship between \( a \) and \( b \)?

- A. \( a = b \)
- B. \( a > b \)
- C. \( a < b \)
- D. There is not enough information to determine the relationship.

10. The graph of \( y = 2x^2 \) is shown below.

Which of the following shows the graph of \( y = 2x^2 - 4 \)?

- F
- H
- G
- J

11. The health club charges a $75 membership fee plus a $40 monthly fee. Wesley has $300 to spend on a health club membership. Which inequality can be used to find \( m \), the number of months for which Wesley can afford to be a member of the health club?

- A. \( 300 \geq 75 + 40m \)
- B. \( 300 \leq 75m + 40 \)
- C. \( 300 \geq 75 + 40m \)
- D. \( 300 \geq 75 + 40 \)

12. The number of cars sold in May \( m \) was 60 less than four times the number of cars sold in April \( a \). Which equation shows the relationship between \( m \) and \( a \)?

- F. \( m = a - 60 \)
- H. \( m = a - 60 \)
- G. \( m = 60 - 4a \)
- J. \( m = 4a - 60 \)

13. The graph below shows several ordered pairs for a linear function.

Which is the best prediction of the value of \( y \) when \( x \) is 7?

- A. -1.5
- B. -2
- C. -2.5
- D. -3.5

14. Solve for \( x \):

\[ 12 - 14x = -72 \]

- F. -36
- H. 36
- G. -6
- J. 6
15 The graph shows part of the line \( y = -\frac{1}{2}x + b \). What is the value of \( b \)?

A \(-\frac{1}{2}\) B \(2\) C \(3\) D \(6\)

16 In which graph does the shaded area show the solutions to the inequality \( 3x - 2y \leq -6 \)?

F (1, 3) G (3, 1) H (3, 2) J (1, 2)

17 Which is NOT a reasonable solution to the inequality \( 2x \geq x^2 \)?

A \(x = -1\) B \(x = 0\) C \(x = 1\) D \(x = 2\)

18 Molly has $5.20 in dimes and quarters. The number of dimes is 3 more than the number of quarters. Which system of linear equations can be used to find \( d \), the number of dimes, and \( q \), the number of quarters?

F \(3q + d = 5.20\)
G \(d = 3 + q\)
H \((q + 3) + q = 5.20\)
J \(q = 3 + d\)

19 Which shows the solution set of the following system of inequalities?

\[
\begin{align*}
\text{F} & \quad x - y \leq -1 \\
\text{G} & \quad x - 2y < 0
\end{align*}
\]

20 What are the solutions to the equation \( 2x^2 + 9x = 5 \)?

F \(x = -1, x = \frac{5}{2}\) G \(x = 1, x = -\frac{5}{2}\) H \(x = 5, x = -\frac{1}{2}\) J \(x = -5, x = \frac{1}{2}\)
21 Which of these shows the graphs of $y = x$ and $y = -x$?

A

B

C

D

21 D

22 Which relationship is best shown by the graph?

F

G

H

J

22 G

23 Which algebraic expression represents the phrase “6 less than the sum of $x$ and the square of $x$”?

A $x + x^2 - 6$

B $x + \sqrt{x} - 6$

C $6 - x + x^2$

D $6 - (x + x^2)$

23 A

24 Which expression is equivalent to $-3(8 - 10)$?

A $-24 - 30$

B $-24 + 30$

C $-24 - 10$

D $24 - 30$

24 H

25 What is the equation of the line shown?

A $y = -2x + 4$

B $y = 4x - 2$

C $y = -2x - 4$

D $y = 4x + 2$

25 A

26 Which is an equation of the line that has a slope of $-\frac{1}{3}$ and passes through the point $(−5, 2)$?

F $x - 3y = -11$

G $x - 3y = 11$

H $x + 3y = 1$

J $x + 3y = 21$

26 H

27 The weight of an object on the moon varies directly as its weight on earth. The constant of variation is 6. Which equation describes this relationship?

A $y = 6x$

B $y = x + 6$

C $xy = 6$

D $x + y = 6$

27 A

28 Adam bought CDs for $18 each and T-shirts for $11 each. Altogether, he spent $105. Which equation best represents Adam’s purchase?

F $4c + 3t = 105$

G $18c + 11t = 105$

H $29ct = 105$

J $(18 + 11)(c + t) = 105$

28 G

29 Simplify $\sqrt{2} \cdot \frac{b}{a} \cdot \frac{b^2}{a^b}$

A $\frac{b^3}{a^2}$

B $\frac{b^3}{a^2}$

C $\frac{1}{a} \cdot b^2$

D $\frac{1}{a} \cdot b^2$

29 C

30 Which relationship would most likely have a negative correlation?

F the time elapsed, and the number of words typed

G the temperature outside, and the number of people wearing coats

H the number of students in a school, and the number of teachers in the school

J the rate at which a car is driven, and the number of miles driven in one hour

30 G
1. The total cost $c$ of buying $b$ cans of beans can be found using the equation $c = 0.79b$. What is represented by the dependent variable?
   A. The total cost of $b$ cans  
   B. The cost of 1 can 
   C. The number of cans purchased 
   D. The number of cans that can be purchased for $0.79$

2. Which equation describes the functional relationship shown in the table?

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>-6</td>
</tr>
<tr>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

   A. $f(x) = 3x$ 
   B. $f(x) = |3x|$ 
   C. $f(x) = -3x$ 
   D. $f(x) = -|3x|$ 

3. Which is an equation of the line that has a slope of $\frac{1}{2}$ and passes through the point $(3, -1)$?
   A. $x + 2y = 1$ 
   B. $x + 2y = -1$ 
   C. $x - 2y = 5$ 
   D. $x - 2y = 8$

4. A certain oak tree is 12 feet taller than a certain pine tree. If the pine tree is $p$ feet tall, which expression represents the height of the oak tree?
   F. $12 + p$ 
   G. $12 - p$ 
   H. $p - 12$ 
   J. $12p$

5. Simplify the expression $4(2x - 1) - 3(x + 5)$.
   A. $3x - 19$ 
   B. $5x - 16$ 
   C. $5x - 19$ 
   D. $9x - 2$

6. The table below shows the number of diagonals in certain polygons. Which expression describes the number of diagonals in a polygon with $n$ sides?

<table>
<thead>
<tr>
<th>Number of Sides</th>
<th>Number of Diagonals</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
</tr>
</tbody>
</table>

   F. $n(n - 3)$ 
   G. $\frac{n(n - 3)}{2}$ 
   H. $\frac{(n - 3)}{2}$ 
   J. $\frac{n}{2}$

7. The table below shows the sum of the interior angle measures of certain polygons. According to the information in the table, which is the best prediction of the sum of the interior angle measures in an 11-gon?

<table>
<thead>
<tr>
<th>Number of Sides</th>
<th>Sum of Interior Angle Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>180°</td>
</tr>
<tr>
<td>4</td>
<td>360°</td>
</tr>
<tr>
<td>5</td>
<td>540°</td>
</tr>
<tr>
<td>6</td>
<td>720°</td>
</tr>
</tbody>
</table>

   A. 900° 
   B. 1260° 
   C. 1440° 
   D. 1620°

8. Which shows the graph of $y = x^2$?

   F. 
   H. 
   G. 
   J.
9. What is the slope of a line that passes through (4, −1) and (2, 9)?
   A $\frac{3}{7}$, C $−5$
   B $−\frac{3}{7}$, D $−4$

10. What is the x-intercept of the graph of $3x − 4y = 12$?
    F $−4$, G $−3$, H $3$, J $4$

11. What is the range of the function $f(x) = x^2 + 6x + 9$?
    A all real numbers, B all real numbers greater than or equal to 0
    C all real numbers greater than or equal to 3, D all real numbers greater than or equal to 9

12. Which of the following methods can be used to solve the linear equation $3x − 2 = 9$?
    F Graph $y = 3x − 2$ and identify the x-intercept.
    G Graph $y = 3x − 11$ and identify the x-intercept.
    H Graph $y = 3x − 2$ and identify the y-intercept.
    J Graph $y = 3x − 11$ and identify the y-intercept.

13. The sum of two numbers is 27. The larger number is 6 more than twice the smaller number. Which system of equations can be used to find the two numbers?
    A $xy = 27$
    $y = 6 + x$
    B $x + y = 27$
    $y = 6 + x$
    C $x + y = 27$
    $y = 6 + 2x$
    D $xy = 27$
    $y = 6 + 2x$

14. What are the solutions of the equation $x^2 − 3x − 1 = 0$?
   F $\frac{3 + \sqrt{13}}{2}$ and $\frac{3 + \sqrt{13}}{2}$
   G $\frac{3 + \sqrt{13}}{2}$ and $\frac{3 − \sqrt{13}}{2}$
   H $\frac{3 + \sqrt{5}}{2}$ and $\frac{3 − \sqrt{5}}{2}$
   J $\frac{3 + \sqrt{13}}{2}$ and $\frac{3 − \sqrt{13}}{2}$

15. Eleanor has a garden in the shape of a right isosceles triangle. Two sides of the triangle measure 10 feet long each. What is the length of the third side?
   A 20 feet, B $10 \sqrt{3}$ feet, C 15 feet, D $10 \sqrt{2}$ feet

16. A triangle undergoes an enlargement as shown in the diagram below. What is x?
   F 36, G 37, H 41, J 56.25
17 For the right triangle shown below, what is the tangent of \( \angle A \)?

\[ \tan A = \frac{3}{4} \]

18 A plane intersects a right cylinder parallel to one of the cylinder's bases. What is the shape of the intersection?

- F circle
- G rectangle
- H ellipse
- J trapezoid

19 The volume of a cone is given by the formula \( V = \frac{1}{3} \pi r^2 h \). What is the volume of the cone below, to the nearest whole number? Use 3.14 for \( \pi \).

\[ V = \frac{1}{3} \times 3.14 \times 3^2 \times 6 = 56.52 \text{ cubic inches} \]

A 100 cubic inches
B 126 cubic inches
C 301 cubic inches
D 377 cubic inches

20 A scientist has two similar cylindrical beakers. Beaker A has radius 6 centimeters. Beaker B has radius 3 centimeters. Which answer correctly completes the statement?

The volume of Beaker A is ______ times the volume of Beaker B.

- F \( \sqrt{2} \)
- G 2
- H \( 2^2 \)
- J \( 2^3 \)

21 Which figure has the views shown?

- A
- B
- C
- D
22. Ed needs to paint the front wall on the building shown below. What is the area of the wall?

- F. 216 square feet
- G. 234 square feet
- H. 244 square feet
- J. 260 square feet

23. The line $y = mx + 7$ is perpendicular to the line $y = \frac{4}{3}x - 9$. What is $m$?

- A. $\frac{3}{4}$
- B. $-\frac{3}{4}$
- C. $\frac{4}{3}$
- D. $-\frac{4}{3}$

24. In the right triangle below, $M$ is the midpoint of hypotenuse $QR$.

Which expression represents the distance from point $P$ to point $M$?

- F. $\sqrt{\left(\frac{a+e}{2}\right)^2 + \left(\frac{d+b}{2}\right)^2}$
- G. $\sqrt{\left(\frac{a+e}{2}\right)^2 + \left(\frac{d+b}{2}\right)^2}$
- H. $\sqrt{\left(\frac{e-g}{2}\right)^2 + \left(\frac{d-b}{2}\right)^2}$
- J. $\sqrt{\left(\frac{e-g}{2}\right)^2 + \left(\frac{d-b}{2}\right)^2}$

25. A circle has its center at $(4, -2)$ and has a radius of 3. What is the equation of the circle?

- A. $(x - 4)^2 + (y - 2)^2 = 9$
- B. $(x - 4)^2 + (y + 2)^2 = 9$
- C. $(x - 4)^2 + (y - 2)^2 = 3$
- D. $(x - 4)^2 + (y + 2)^2 = 3$

26. For the circle below, which expression can be used to find the area of the shaded region?

- F. $\frac{1}{3} \cdot 16\pi$
- G. $\frac{2}{3} \cdot 16\pi$
- H. $\frac{1}{3} \cdot 64\pi$
- J. $\frac{2}{3} \cdot 64\pi$

27. The radius of the circle below is 5 centimeters. Line segment $AB$ is a diameter of the circle. What is the value of $x$ to the nearest tenth?

- A. 6.7
- B. 7.3
- C. 8.9
- D. 9.5
28 Which single transformation is shown below?

F Translation  H Rotation
G Reflection  J Dilation

28 Based on the information in the diagram, which triangle congruence property can be used to justify that \( \triangle ABC \cong \triangle FGH? \)

A SSS (If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.)
B SAS (If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.)
C ASA (If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.)
D AAS (If two angles and a side of one triangle are congruent to two angles and a side of another triangle, then the triangles are congruent.)

30 Triangle \( ABC \) has coordinates \( A(0, 6), B(3, 0), \) and \( C(4, 3). \) Triangle \( ABC \) is reflected across the \( x \)-axis. What are the coordinates of \( C'? \)

F \((-3, 4)\)       H \((-4, 3)\)
G \((3, 4)\)       J \((4, -3)\)