Prepping for the North Carolina End-of-Grade (EOG) Test
Practice and Sample Test Workbook

Includes:

- 2003 North Carolina Course of Study Content Standards, Grade 6
- Student Recording Chart
- Diagnostic Test
- Numerous Practice Questions for Each Content Standard
- Full-Size Sample Test
Test-Taking Tips

• Go to bed early the night before the test. You will think more clearly after a good night's rest.

• Read each problem carefully and think about ways to solve the problem before you try to answer the question.

• Relax. Most people get nervous when taking a test. It's natural. Just do your best.

• Answer questions you are sure about first. If you do not know the answer to a question, skip it and go back to that question later.

• Think positively. Some problems may seem hard to you, but you may be able to figure out what to do if you read each question carefully.

• If no figure is provided, draw one. If one is furnished, mark it up to help you solve the problem.

• When you have finished each problem, reread it to make sure your answer is reasonable.

• Become familiar with a variety of formulas and when they should be used.

• Make sure that the number of the question on the answer sheet matches the number of the question on which you are working in your test booklet.
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Overview

The material in this booklet is designed to help you prepare for the Grade 6 North Carolina End-of-Grade (EOG) Test.

It contains:

• a Student Recording Chart,
• the 2003 North Carolina Content Standards, Grade 6,
• a Diagnostic Test,
• practice for each Content Standard, and
• a Sample Test.

How to Use This Book

Diagnostic Test  This test will help you identify any weaknesses you may have as you prepare to take the Grade 6 EOG Test. Once you’ve taken the test and it’s been graded, complete the Student Recording Chart that is found on page v. Mark an × in the square for each question that you answered incorrectly.

Practice  If you missed one or two of the questions for a particular objective, you could probably use some extra practice with that objective. The Student Recording Chart lists practice pages for each objective. Complete the appropriate practice pages. If you are unsure about how to do some of the problems, you may want to refer to your mathematics book.

Sample Test  After you have completed your Standards Practice worksheet(s), take the Sample Test found on pages 101 to 116.
# Student Recording Chart

**Directions** Mark an × by each question from the Diagnostic Test that you answered *incorrectly*. If there are one or two ×s marked for an objective, write Yes in the *Need Practice?* box. Then complete the practice pages for that objective.

## Number and Operations

<table>
<thead>
<tr>
<th>Objective</th>
<th>1.01</th>
<th>1.02</th>
<th>1.03</th>
<th>1.04</th>
<th>1.05</th>
<th>1.06</th>
<th>1.07</th>
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<td>1  63</td>
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<td>11  17</td>
<td>54  71</td>
<td>14  25</td>
<td>18  30</td>
</tr>
<tr>
<td>Size</td>
<td>38 □</td>
<td>76 □ 79 □</td>
<td>80 □</td>
<td>70 □ 75 □</td>
<td>77 □</td>
<td>48 □ 64 □</td>
<td>43 □</td>
</tr>
<tr>
<td>Need Practice?</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

## Measurement and Geometry

<table>
<thead>
<tr>
<th>Objective</th>
<th>2.01</th>
<th>2.02</th>
<th>3.01</th>
<th>3.02</th>
<th>3.03</th>
<th>3.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Questions</td>
<td>15  33</td>
<td>2  3</td>
<td>7  42</td>
<td>4  16</td>
<td>23  58</td>
<td>21  22</td>
</tr>
<tr>
<td>Size</td>
<td>44 □ 65 □</td>
<td>19 □</td>
<td>50 □ 72 □</td>
<td>55 □</td>
<td>67 □ 68 □</td>
<td>46 □</td>
</tr>
<tr>
<td>Need Practice?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Practice Pages</td>
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## Data Analysis and Probability

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<tr>
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<th>4.01</th>
<th>4.02</th>
<th>4.03</th>
<th>4.04</th>
<th>4.05</th>
<th>4.06</th>
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<tr>
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<td>36  37</td>
<td>26  27</td>
<td>8  34</td>
</tr>
<tr>
<td>Size</td>
<td>60 □ 74 □</td>
<td>78 □</td>
<td>56 □ 57 □</td>
<td>69 □</td>
<td>28 □ 29 □</td>
<td>45 □</td>
</tr>
<tr>
<td>Need Practice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Practice Pages</td>
<td>66–68</td>
<td>69–72</td>
<td>73–76</td>
<td>77–80</td>
<td>81–84</td>
<td>85–88</td>
</tr>
</tbody>
</table>

## Algebra

<table>
<thead>
<tr>
<th>Objective</th>
<th>5.01</th>
<th>5.02</th>
<th>5.03</th>
<th>5.04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Questions</td>
<td>35  39</td>
<td>9  10</td>
<td>20  31</td>
<td>12  51</td>
</tr>
<tr>
<td>Size</td>
<td>53 □ 73 □</td>
<td>13 □</td>
<td>32 □ 61 □</td>
<td>66 □</td>
</tr>
<tr>
<td>Need Practice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice Pages</td>
<td>89–91</td>
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</tr>
</tbody>
</table>
**2003 North Carolina Content Standards, Grade 6**

<table>
<thead>
<tr>
<th>Competency Goals and Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMPETENCY GOAL 1:</strong> The learner will understand and compute with rational numbers.</td>
</tr>
<tr>
<td>1.01 Develop number sense for negative rational numbers.</td>
</tr>
<tr>
<td>(a) Connect the model, number word, and number using a variety of representations including the number line.</td>
</tr>
<tr>
<td>(b) Compare and order.</td>
</tr>
<tr>
<td>(c) Make estimates in appropriate situations.</td>
</tr>
<tr>
<td>1.02 Develop meaning for percents.</td>
</tr>
<tr>
<td>(a) Connect the model, number word, and number using a variety of representations.</td>
</tr>
<tr>
<td>(b) Make estimates in appropriate situations.</td>
</tr>
<tr>
<td>1.03 Compare and order rational numbers.</td>
</tr>
<tr>
<td>1.04 Develop fluency in addition, subtraction, multiplication, and division of non-negative rational numbers.</td>
</tr>
<tr>
<td>(a) Analyze computational strategies.</td>
</tr>
<tr>
<td>(b) Describe the effect of operations on size.</td>
</tr>
<tr>
<td>(c) Estimate the results of computations.</td>
</tr>
<tr>
<td>(d) Judge the reasonableness of solutions.</td>
</tr>
<tr>
<td>1.05 Develop fluency in the use of factors, multiples, exponential notation, and prime factorization.</td>
</tr>
<tr>
<td>1.06 Use exponential, scientific, and calculator notation to write very large and very small numbers.</td>
</tr>
<tr>
<td>1.07 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPETENCY GOAL 2: The learner will select and use appropriate tools to measure two- and three-dimensional figures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.01 Estimate and measure length, perimeter, area, angles, weight, and mass of two- and three-dimensional figures using appropriate tools.</td>
</tr>
<tr>
<td>2.02 Solve problems involving perimeter/circumference and area of plane figures.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPETENCY GOAL 3: The learner will understand and use properties and relationships of geometric figures in the coordinate plane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.01 Identify and describe the intersection of figures in a plane.</td>
</tr>
<tr>
<td>3.02 Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationships among them.</td>
</tr>
<tr>
<td>3.03 Transform figures in the coordinate plane and describe the transformations.</td>
</tr>
<tr>
<td>3.04 Solve problems involving geometric figures in the coordinate plane.</td>
</tr>
</tbody>
</table>
### Competency Goals and Objectives

#### COMPETENCY GOAL 4: The learner will understand and determine probabilities.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.01</td>
<td>Develop fluency with counting strategies to determine the sample space for an event. Include lists, tree diagrams, frequency distribution tables, permutations, combinations, and the Fundamental Counting Principle.</td>
</tr>
<tr>
<td>4.02</td>
<td>Use a sample space to determine the probability of an event.</td>
</tr>
<tr>
<td>4.03</td>
<td>Conduct experiments involving simple and compound events.</td>
</tr>
<tr>
<td>4.04</td>
<td>Determine and compare experimental and theoretical probabilities for simple and compound events.</td>
</tr>
<tr>
<td>4.05</td>
<td>Determine and compare experimental and theoretical probabilities for independent and dependent events.</td>
</tr>
<tr>
<td>4.06</td>
<td>Design and conduct experiments or surveys to solve problems; report and analyze results.</td>
</tr>
</tbody>
</table>

#### COMPETENCY GOAL 5: The learner will demonstrate an understanding of simple algebraic expressions.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
</table>
| 5.01      | Simplify algebraic expressions and verify the results using the basic properties of rational numbers.  
  (a) Identity.  
  (b) Commutative.  
  (c) Associative.  
  (d) Distributive.  
  (e) Order of operations. |
| 5.02      | Use and evaluate algebraic expressions. |
| 5.03      | Solve simple one- and two-step equations or inequalities. |
| 5.04      | Use graphs, tables, and symbols to model and solve problems involving rates of change and ratios. |
Diagnostic Test

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Which is 40 percent written as a decimal? 1.02
   A  4.0
   B  0.40
   C  0.04
   D  \( \frac{2}{5} \)

Use the following information for Questions 2 and 3.
Charlotte is making curtains for her bedroom window. The window is 6 feet wide and 3 feet high. The length of the fabric that she buys must be \( \frac{3}{2} \) times the width of the window, and she needs the fabric to be an extra foot wide for the hems.

2 How many square feet of material does Charlotte need? 2.02
   A  36 square feet
   B  30 square feet
   C  27 square feet
   D  18 square feet

3 If the fabric costs $8 per square yard, how much will her curtains cost? 3
   A  $16
   B  $32
   C  $96
   D  $288

4 If the diameter of a circle is 16 centimeters, which is a reasonable length for a chord? 3.02
   A  12 centimeters
   B  18 centimeters
   C  24 centimeters
   D  32 centimeters

5 Carlos was choosing 2 games to play. His choices were a card game, a board game, and a computer game. In how many ways can he choose the 2 games? 4.01
   A  1
   B  2
   C  3
   D  6

6 The thermometer in the figure shows the temperature one night in Little Switzerland. Approximately what temperature does the thermometer show? 1.01
   A  0°C
   B  −5°C
   C  −10°C
   D  −15°C
7. What is the intersection of $AB$ and $CD$? 3.01

A. $E$
B. $\angle AED$
C. $\angle CED$
D. $ACBD$

8. A travel agency is trying to market a cruise to Alaska. To which group should they send information in order to find out how many people might be interested in such a cruise? 4.06
A. a random sample of adults of all ages
B. a random sample of adults with young children
C. a random sample of high school students
D. a random sample of sixth graders

For Questions 9 and 10, suppose it costs $15 per hour for an adult to go horseback riding and $8 per hour for a child.

9. Which expression represents the total cost for $a$ adults and $c$ children to go horseback riding for an hour? 5.02
A. $15a + 8c$
B. $8a + 15c$
C. $23ac$
D. $(15 + 8)(a + c)$

10. How much would it cost for 2 adults and 4 children to go horseback riding for an hour? 5.02
A. $23$
B. $46$
C. $62$
D. $76$

11. Which of the following numbers, when multiplied by $\frac{2}{3}$, results in a number greater than $\frac{2}{3}$? 1.04
A. $\frac{1}{3}$
B. $\frac{9}{10}$
C. 1
D. $\frac{3}{2}$
Diagnostic Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

12 This table shows the percent of average daily adult fiber requirement provided by different amounts of green peas.

<table>
<thead>
<tr>
<th>Amount of Green Peas</th>
<th>Percent of Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ cup</td>
<td>9.1%</td>
</tr>
<tr>
<td>4 cups</td>
<td>72.8%</td>
</tr>
</tbody>
</table>

What percent of average daily adult fiber requirement would 2 cups of green peas provide? 5.04
A 18.2%  
B 36.4%  
C 45.5%  
D 54.6%

13 What is the value of $5 + 2x - y^2$ if $x = 12$ and $y = 3$? 5.02
A 13  
B 20  
C 26  
D 75

14 The largest emerald ever found in North Carolina was $1.438 \times 10^3$ carats. How is $1.438 \times 10^3$ written in standard form? 1.06
A 14,380  
B 1,438  
C 143.8  
D 14.38

15 Pennies made before 1982 were 95 percent copper and 5 percent zinc. The mass of a pre-1982 penny is about 3.1 grams. From 1982 on, pennies are 97.6 percent zinc and 2.4 percent copper. Their mass is about 2.5 grams. Approximately how many 1993 pennies would have the same total mass as 48 pre-1982 pennies? 2.01
A about 39  
B about 48  
C about 60  
D about 80

16 The radius of a circle is 10 centimeters. Which statement is true? 3.02
A The diameter of the circle is 5 centimeters.  
B The circumference of the circle is $10\pi$ centimeters.  
C A chord of the circle could have length 50 centimeters.  
D A chord of the circle could have length 15 centimeters.
Diagnostic Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

17 A group of scouts helped rangers clear a trail after an ice storm. They cleared tree branches from $\frac{25}{6}$ miles of trail the first day. On the second day, they cleared $\frac{3\frac{1}{4}}{1}$ miles of trail. If the length of the trail is $\frac{8\frac{3}{4}}{1}$ miles, about how many miles of trail do they have left to clear?  

A 2 miles  
B 3 miles  
C 4 miles  
D 5 miles

18 This table shows the cost of several items that Sandy bought for lunch at the school cafeteria. Sandy did not have a calculator with him. How could he make finding the total cost easier?  

<table>
<thead>
<tr>
<th>Food</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>mints</td>
<td>$0.79</td>
</tr>
<tr>
<td>salad</td>
<td>$1.50</td>
</tr>
<tr>
<td>juice</td>
<td>$1.21</td>
</tr>
<tr>
<td>sandwich</td>
<td>$3.50</td>
</tr>
</tbody>
</table>

A Add 0.79 + 1.50 and add 1.21 and 3.50, then add the two sums.  
B Add 0.79 + 3.50 and add 1.50 and 1.21, then add the two sums.  
C Find the mean of 0.79 and 3.50 and multiply it by 4.  
D Add 0.79 and 1.21 and add 1.50 and 3.50, then add the two sums.

19 What is the area within the archway shown in the figure? The archway consists of a rectangle and a semicircle.  

A 24 square meters  
B $10 + 4\pi$ square meters  
C $20 + 2\pi$ square meters  
D $24 + 2\pi$ square meters

20 What is the solution of the equation $c - 2 = 10$?  

A 8  
B 10  
C 12  
D 20
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

For Questions 21 and 22, use the figure shown on the graph.

21 If $WXYZ$ is rotated 90º counterclockwise about the origin, in what quadrant will the image of $W$ lie?  
   A I  
   B II  
   C III  
   D IV  

22 What is the perimeter of $WXYZ$?  
   A 6 units  
   B 9 units  
   C 10 units  
   D 12 units  

23 Given the transformation $T(x, y) \rightarrow (x + 2, y - 5)$, what is $T(1, 6)$?  
   A $(-1, 11)$  
   B $(8, -4)$  
   C $(2, -11)$  
   D $(3, 1)$  

24 Point $P$ is the graph of which rational number?  
   A $-\frac{3}{4}$  
   B $-\frac{1}{2}$  
   C $-1\frac{1}{4}$  
   D $-\frac{3}{4}$  

25 The Scuppernong grape is over 400 years old. How is 400 written in scientific notation?  
   A $4.0 \times 10^0$  
   B $4.0 \times 10^1$  
   C $4.0 \times 10^2$  
   D $4.0 \times 10^3$
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information for Questions 26–29.
The members of the choir, including Josef, each bought gifts for other choir members. They chose the names at random from a bag. All 30 choir members’ names were in the bag.

26 If Josef chose 1 name, looked at it, put it back, and then chose a second name, what is the probability that he got his own name both times? 4.05
   A \( \frac{1}{900} \)   B \( \frac{1}{870} \)
   C \( \frac{1}{30} \)   D \( \frac{1}{15} \)

27 If Josef chose 1 name, put it aside, and then chose a second name, what is the probability that he got the same person each time? 4.05
   A \( \frac{1}{900} \)   B \( \frac{1}{870} \)
   C \( \frac{1}{15} \)   D 0

28 Which statement is true? 4.05
   A The situation in question 26 gives independent events while the situation in question 27 gives dependent events.
   B The situation in question 26 gives dependent events while the situation in question 27 gives independent events.
   C The situations in question 26 and 27 are both independent events.
   D The situations in question 26 and 27 are both dependent events.

29 What is the probability that Josef drew Pam first and then Lou, if he did not put the first slip back in the bag before he drew the second name? 4.05
   A \( \frac{1}{900} \)   B \( \frac{1}{870} \)
   C \( \frac{1}{30} \)   D \( \frac{1}{15} \)

30 Ruthie had to read 150 pages in 10 days. About how many pages did she have to read each day? 1.07
   A 140   B 50
   C 15   D 5

North Carolina End-of-Grade Test, Grade 6
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

For Questions 31 and 32, Jermaine rides a ski lift to the top of a ski run. The ride takes $x$ minutes.

31 If it takes Jermaine 5 minutes to ski down the mountain and the total time to the top and back was 47 minutes, which equation could be used to find $x$?

A $x + 5 = 47$
B $2x + 5 = 47$
C $x - 5 = 47$
D $2 + 5x = 47$

32 About how long does the lift ride take?

A 23 minutes
B 42 minutes
C 52 minutes
D 57 minutes

33 What is the measure of $\angle ABC$ shown in the figure?

A $30^\circ$
B $40^\circ$
C $50^\circ$
D $140^\circ$

34 A roof repair company is calling potential customers. To which group of people should they make most of their calls?

A owners of manufactured homes
B apartment renters
C owners of condominiums
D owners of houses

35 Marissa wanted to add $(92 + 17) + 83$. She rewrote the problem using the Associative Property of Addition so the computation would be easier. Which expression did she write?

A $(17 + 92) + 83$
B $83 + (92 + 17)$
C $83(92 + 17)$
D $92 + (17 + 83)$
Use the following information for Questions 36 and 37.

The figure below shows a square dartboard divided into 9 equal square sections. Khalid hits the dartboard with a dart 27 times. The number of times he hit each small square is shown in the table. Assume it is equally likely for Khalid to hit each square.

<table>
<thead>
<tr>
<th>Number</th>
<th>Times Hit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

36 Which statement is true? 4.04

A The experimental probability that Khalid hits the 1 square equals the theoretical probability of hitting the 1.
B The experimental probability that Khalid hits the 2 square equals the theoretical probability of hitting the 2.
C The experimental probability that Khalid hits the 4 square equals the theoretical probability of hitting the 4.
D The experimental probability that Khalid hits the 9 square equals the theoretical probability of hitting the 9.

37 What is the experimental probability that Khalid hits the 6 square? 4.04

A $\frac{1}{27}$
B $\frac{2}{27}$
C $\frac{1}{9}$
D $\frac{4}{27}$

38 Which gives $-3, -\frac{1}{2}, -6.5, \text{ and } -0.3$ in order from least to greatest? 1.01

A $-3, -\frac{1}{2}, -0.3, -6.5$
B $-6.5, -3, -0.3, -\frac{1}{2}$
C $-0.3, -\frac{1}{2}, -3, -6.5$
D $-6.5, -3, -\frac{1}{2}, -0.3$
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

39 What property is illustrated by $17 \times 1 = 17$? 5.01  
A Identity Property for Multiplication  
B Identity Property for Addition  
C Multiplicative Inverse Property  
D Additive Inverse Property  

For Questions 40 and 41, the letters in CAROLINA are each on a square tile.

40 If one tile is selected at random, what is the probability that it is an A or an O? 4.03  
A $\frac{1}{4}$  
B $\frac{3}{8}$  
C $\frac{1}{2}$  
D $\frac{2}{3}$

41 Two tiles are chosen at random, without replacement. If the first is a C, what is the probability that the second is an A? 4.03  
A $\frac{1}{8}$  
B $\frac{1}{6}$  
C $\frac{1}{4}$  
D $\frac{2}{7}$

42 What is the intersection of $\overline{AC}$ and $\overline{BC}$ shown in the figure? 3.01  
A $\overline{AC}$  
B $\overline{AB}$  
C $\overline{BC}$  
D $\overline{B}$

43 Which problem would be most appropriate for mental computation? 1.07  
A $25 \times 7 \times 4$  
B $25 \times 13 \times 92$  
C $25 \times 1.03 \times 19.6$  
D $25 \times 101 \times 99$
Diagnostic Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

44 Approximately what is the length of the spoon shown?  

![Spoon Image]

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

45 To which group should a gardening store select to send a seed catalog?  

- A parents of 6th graders who attended a flower show
- B parents of 6th graders who attended an ice-skating show
- C 6th graders who live in apartments
- D a random sample of 6th graders

46 Which transformations will produce the image $A'B'C'D'$ of $ABCD$ as shown on the graph?  

![Graph Image]

- A a reflection over the $x$-axis then a translation 5 to the right
- B a reflection over the $y$-axis then a reflection over the $x$-axis
- C a reflection over the $x$-axis then a translation 4 to the left
- D a rotation 90 degrees clockwise about the origin

47 Which of these is least?  

- A $\frac{13}{4}$
- B 2
- C 1.4
- D 3.06

48 The area of Cape Lookout National Seashore is $2.85 \times 10^4$ acres. What is this area in decimal notation?  

- A 285 acres
- B 2,850 acres
- C 28,500 acres
- D 285,000 acres
49 Which statement is true? 1.03
A \( \frac{6}{4} > \frac{5}{3} \)
B \( \frac{6}{4} < \frac{5}{3} \)
C \( \frac{6}{4} = \frac{5}{3} \)
D \( \frac{6}{4} = 6.1 \)

50 What is the intersection of the circle and the \( x \)-axis? 3.01
A There is no intersection.
B (4, 3)
C (0, 4)
D (4, 0)

51 Which graph shows a constant rate of change? 5.04

52 If 2 fair coins are tossed, the sample space is \{HH, HT, TH, TT\} where H represents heads and T represents tails. What is the probability of getting 2 heads? 4.02
A \( \frac{1}{4} \)
B \( \frac{1}{2} \)
C \( \frac{3}{4} \)
D 1

53 What property is \( 6(5x + 4) = (6 \times 5x) + (6 \times 4) \) an example of? 5.01
A Commutative Property of Addition
B Associative Property of Multiplication
C Distributive Property
D Multiplication Property
Diagnostic Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

54 Which number is a factor of 24, 30, and 36? 1.05
   A 4  B 6
   C 8  D 12

55 Which statement is true? 3.02
   A Every diameter of a circle contains the center.
   B The endpoints of a radius are both on the circle.
   C The circumference of a circle is measured in square units.
   D The diameter of a circle is shorter than every chord.

58 What transformation maps \( XYZW \) onto \( X'Y'Z'W' \) as shown on the graph? 3.03
   A a reflection  B a rotation
   C a translation  D a dilation

56 If 1 candle is chosen at random, what is the probability that it is a taper or a tea light? 4.03
   A \( \frac{1}{2} \)  B \( \frac{3}{5} \)
   C \( \frac{2}{3} \)  D \( \frac{9}{10} \)

57 If 2 candles are chosen and removed at random and the first is a tea light, what is the probability that the second is a taper? 4.03
   A \( \frac{4}{9} \)  B \( \frac{2}{5} \)
   C \( \frac{1}{3} \)  D \( \frac{1}{5} \)

For Questions 56 and 57, use the table of candles.

<table>
<thead>
<tr>
<th>Type of Candle</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>taper</td>
<td>4</td>
</tr>
<tr>
<td>tea light</td>
<td>5</td>
</tr>
<tr>
<td>votive</td>
<td>1</td>
</tr>
</tbody>
</table>
For Questions 59 and 60, Irina is buying a car. The tree diagram shows her choices.

59 How many possibilities are in the sample space? 4.01
   A  8
   B  12
   C  16
   D  24

60 Which is an element of the sample space? 4.01
   A  red, silver, black
   B  red, 8 cylinder, 6 cylinder, cloth
   C  black, 6 cylinder, cloth, leather
   D  silver, 6 cylinder, leather

61 What is the solution of $5a < 20$? 5.03
   A  $a < 4$
   B  $a < 15$
   C  $a > 4$
   D  $a > 15$

62 Penelope was buying a computer. It could have a 15 inch, 17 inch, or 19 inch flat screen monitor. She could buy a CD-RW drive or a DVD-RW drive. If she lets the salesman randomly design her computer, what is the probability it will have a 17 inch monitor and a DVD-RW drive? 4.02
   A  $\frac{1}{12}$
   B  $\frac{1}{6}$
   C  $\frac{1}{3}$
   D  $\frac{1}{2}$

63 If 4 of 39 sixth graders wear glasses, which is a reasonable estimate of the percent of sixth graders who wear glasses? 1.02
   A  20%
   B  15%
   C  10%
   D  4%

64 A box contains $2^4 \times 3^2$ pencils. How many pencils are in the box? 1.06
   A  24
   B  72
   C  96
   D  144
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

65 Which is a reasonable estimate for the weight of a house brick?  2.01
   A 1 ounce  
   B 1 pound  
   C 30 pounds  
   D 1 ton  

66 If 200 students were surveyed and are represented on the circle graph, how many prefer country music?  5.04
   A 25  
   B 50  
   C 70  
   D 100  

For Questions 67 and 68, use the graph of point M.

67 What is the image of M rotated 180 degrees counterclockwise about the origin?  3.03
   A (-3, 2)  
   B (-2, 3)  
   C (-3, -2)  
   D (-3, 0)  

68 What is the image of M translated 6 units left and 2 units up?  3.03
   A (-3, 2)  
   B (-3, -2)  
   C (-2, 3)  
   D (-3, 0)  

69 Miguela tossed a penny 50 times. It came up heads 27 times. Which statement is true?  4.04
   A The experimental probability of getting a head equals the theoretical probability of getting a head.  
   B The experimental probability of getting a head is greater than the theoretical probability of getting a head.  
   C The experimental probability of getting a head is less than the theoretical probability of getting a head.  
   D The experimental probability of getting a head is equal to the experimental probability of getting a tail.
70 Jaime has an aquarium that holds \(3\frac{1}{2}\) gallons of water. To fill the aquarium, he uses a container that holds about \(\frac{1}{4}\) of a gallon. Jaime wants to know how many containers it will take to fill the aquarium. Which would be a reasonable solution? 1.04
A 4 containers or less  
B between 6 containers and 10 containers  
C between 12 and 15 containers  
D 16 containers or more

71 What is the least common multiple of 14 and 30? 1.05
A 2  
B 140  
C 210  
D 420

72 If 2 distinct lines in a plane intersect, what is their intersection? 3.01
A a line  
B a point  
C a segment  
D an angle

73 Simplify \(2(3 + 4^2)\). 5.01
A 9  
B 22  
C 28  
D 38

74 Suppose an animal shelter in Raleigh has kittens for sale as shown in the frequency distribution table. In how many ways can Josh choose the color of the kitten he buys? 4.01

<table>
<thead>
<tr>
<th>Color</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>white</td>
<td>6</td>
</tr>
<tr>
<td>black</td>
<td>5</td>
</tr>
<tr>
<td>gray</td>
<td>8</td>
</tr>
</tbody>
</table>

A 3  
C 38  
B 19  
D 240

75 Margery was addressing invitations to her birthday party. If she addressed \(\frac{1}{2}\) of the invitations the first day and \(\frac{1}{3}\) on the second day, what fraction of the invitations does she still have to address? 1.04
A \(\frac{5}{6}\)  
B \(\frac{3}{5}\)  
C \(\frac{1}{4}\)  
D \(\frac{1}{6}\)
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

76 What percent of the grapes shown in the figure are shaded? 1.02

A 30%  B 60%
C 70%  D 75%

77 Suppose the Charlotte Monarchs scored $2^2 \times 3^3$ points in a game. How many points did they score? 1.05

A 36  B 54
C 72  D 108

78 What is the probability of getting a 6 when a cube numbered 1–6 is rolled? 4.02

A $\frac{1}{36}$  B $\frac{1}{12}$
C $\frac{1}{6}$  D $\frac{1}{2}$

79 Which is $\frac{1}{4}$ written as a percent? 1.02

A 4%  B 20%
C 25%  D 40%

80 Which number would be graphed to the left of point $A$ on the number line? 1.03

A $\frac{3}{4}$  B $-\frac{1}{4}$
C $\frac{1}{3}$  D $1\frac{1}{2}$
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 1.01** Develop number sense for negative rational numbers. Connect the model, number word, and number using a variety of representations, including the number line. Compare and order. Make estimates in appropriate situations.

For Questions 1 and 2, the shaded counters represent negative numbers and the white counters represent positive numbers.

1. Which mat could represent 7 feet below sea level?
   - A
   - B
   - C
   - D

2. Chip used counters and a mat to keep track of his score in a word game. According to the mat, what is Chip’s score?
   - A $-18$
   - B $-12$
   - C $6$
   - D $12$

3. The record low temperature in North Carolina is $-34^\circ$F, recorded at Mt. Mitchell on January 21, 1985. Which thermometer shows $-34^\circ$F?
   - A
   - B
   - C
   - D
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.01 (continued)

4 Which letter shows the location of $-2.5$?

\[\begin{align*}
PQ & \\
\text{-3} & \text{-2} & \text{-1} & \text{0} & \text{1}
\end{align*}\]

A \( P \) \hspace{1cm} B \( Q \) \hspace{1cm} C \( R \) \hspace{1cm} D \( S \)

5 Chiavo had \( \frac{31}{3} \) points deducted on a science test. Which point on the number line represents the points deducted on his test?

\[\begin{align*}
KJ & \\
-5 & -4 & -3 & -2 & -1 & 0
\end{align*}\]

A \( H \) \hspace{1cm} B \( I \) \hspace{1cm} C \( J \) \hspace{1cm} D \( K \)

6 The table shows extreme low temperatures in January 2003. Which state had the warmest extreme low temperature?

<table>
<thead>
<tr>
<th>City, State</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saranac Lake, New York</td>
<td>-34°F</td>
</tr>
<tr>
<td>Fort Yukon, Alaska</td>
<td>-35°F</td>
</tr>
<tr>
<td>Fryeburg, Maine</td>
<td>-22°F</td>
</tr>
<tr>
<td>Orr, Minnesota</td>
<td>-9°F</td>
</tr>
<tr>
<td>Jordon, Montana</td>
<td>-17°F</td>
</tr>
<tr>
<td>Big Piney, Wyoming</td>
<td>-10°F</td>
</tr>
</tbody>
</table>

A Alaska \hspace{1cm} B Minnesota \hspace{1cm} C New York \hspace{1cm} D Wyoming

7 Which list of numbers is in order from greatest to least?

A \(-2.1, -2.01, -2, -0.2\) \hspace{1cm} B \(-2.01, -2.1, -2, -0.2\) \hspace{1cm} C \(-0.2, -2.01, -2.1, -2\) \hspace{1cm} D \(-0.2, -2, -2.01, -2.1\)

8 Which of the comparisons is not true?

A \( \frac{1}{2} > -\frac{1}{4} \) \hspace{1cm} B \( \frac{2}{3} < -\frac{1}{2} \) \hspace{1cm} C \( \frac{3}{5} > -\frac{5}{8} \) \hspace{1cm} D \( -\frac{3}{5} > -\frac{1}{2} \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.01 (continued)

9 Geologists drill boreholes to determine the ground-water levels below the land surface. The list shows the depths of some boreholes drilled in various regions of North Carolina. Which list shows the sites in ascending order?

<table>
<thead>
<tr>
<th>Site</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp Hope</td>
<td>-4.9</td>
</tr>
<tr>
<td>Comfort</td>
<td>-8.1</td>
</tr>
<tr>
<td>Hornet’s Nest</td>
<td>-5.2</td>
</tr>
<tr>
<td>Mocksville</td>
<td>-14.3</td>
</tr>
<tr>
<td>Simpson</td>
<td>-6.4</td>
</tr>
</tbody>
</table>

A Mocksville, Comfort, Simpson, Hornet’s Nest, Camp Hope
B Mocksville, Comfort, Hornet’s Nest, Simpson, Camp Hope
C Camp Hope, Hornet’s Nest, Simpson, Comfort, Mocksville
D Hornet’s Nest, Camp Hope, Simpson, Comfort, Mocksville

10 Which statement is true?

A \(-7 > -1.5\)
B \(-\frac{2}{3} > -\frac{1}{3}\)
C \(-2.4 < -2.46\)
D \(-\frac{1}{2} < -0.2\)

11 Which list of numbers is in descending order?

A \(-\frac{3}{4}, -0.16, -0.1, -2\)
B \(-2, -0.16, -0.1, -\frac{3}{4}\)
C \(-2, -\frac{3}{4}, -0.16, -0.1\)
D \(-0.1, -0.16, -\frac{3}{4}, -2\)

12 Which symbol makes the following statement true?

\(-2.5 \underline{?} -\frac{9}{4}\)

A =
B ≤
C >
D <

13 A diver descended 46 feet below sea level to explore a shipwreck. After 10 minutes, the diver descended an additional 22 feet to investigate a hole in the hull of the ship. About how deep is the hole in the hull of the ship?

A \(-30\) feet
B \(-60\) feet
C \(-70\) feet
D \(-80\) feet

North Carolina End-of-Grade Test, Grade 6
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.01 (continued)

14 At a social studies competition, one team lost from 9 to 11 points during each of the first three rounds of questions. The team then gained a total of 18 points during the next two rounds. If the team started the competition with zero points, what was their approximate score after five rounds of questions?

A  $20
B  $10
C  10
D  20

15 Rebecca earns money pet sitting for her neighbors. The table shows the payments she received and the money she spent. Rebecca’s net income is the amount of money she has left after she subtracts her expenses from her payments. Which estimate best describes her net income?

<table>
<thead>
<tr>
<th>payment</th>
<th>$7.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>cat toys</td>
<td>$-2.36</td>
</tr>
<tr>
<td>dog toys</td>
<td>$-5.28</td>
</tr>
<tr>
<td>payment</td>
<td>$5.50</td>
</tr>
<tr>
<td>payment</td>
<td>$5.50</td>
</tr>
<tr>
<td>cat and dog treats</td>
<td>$-8.57</td>
</tr>
</tbody>
</table>

A Expenses are about $2 less than her payments, so her net income is about $2.
B Expenses and payments are about the same, so she has approximately zero income.
C Her expenses are about $2 more than her payments, so her net income is about $-2.
D Expenses are $5 or more than her payments, so her net income is over $5.

16 Miguel is digging a hole to plant a lantana bush. After he digs for a while, he rests and then he digs some more. What is the best estimate of the depth of the hole if he first digs to a depth of 5 3/8 inches, then he digs an additional 8 1/2 inches deeper, and finally another 4 1/4 inches deeper?

A  $17 inches
B  $18 inches
C  $19 inches
D  $20 inches
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.02  Develop meaning for percents. Connect the model, number word, and number using a variety of representations. Make estimates in appropriate situations.

1 Which grid represents a sales tax of 7%?

A

B

C

D

1 _________

2 In a survey at Richardson Middle School, \( \frac{37}{2} \% \) of the students said they plan to attend a North Carolina State Wolfpack game. Which model represents \( \frac{37}{2} \% \) shaded?

A

B

C

D

2 _________

3 Which model could not be used to represent 20%?

A

B

C

D

3 _________
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.02 (continued)

The grid represents the proposed design of one section of an arboretum. Use the grid to answer Questions 4 and 5.

4 Which percent represents the rose garden?  
A 3.6%  
B 6%  
C 36%  
D 60%

5 The non-shaded area on the grid represents non-developed sections. Which percent represents the non-developed area?  
A 40%  
B 50%  
C 60%  
D 64%

The number of students who ride the bus to a middle school in Charlotte is 1.25 times the number of students who walk. Which model represents the number 1.25?  
A  
B  
C  
D

Nicholas saw a skateboard on sale for $62 at a sporting goods store. The original price of the skateboard was $79.95. Which is the best estimate of the percent discount on the skateboard?  
A 18%  
B 24%  
C 60%  
D 75%
8 Mr. Chen wants to leave a 15% tip for a dinner that cost $47.65. Which is the best estimate of the tip?  
A $4.00  
B $5.00  
C $7.00  
D $10.00

9 About what percent of the square is shaded?  
A 10%  
B 20%  
C 30%  
D 40%

10 A survey of sixth grade students at Coast Middle School showed that 48 out of 78 students said they would try snow tubing at Sugar Mountain if given the opportunity. About what percent of the students said they would try snow tubing?  
A 70%  
B 60%  
C 50%  
D 40%

11 North Carolina has a total area of 136,420 square kilometers, including 10,241 square kilometers of inland water. About what percent of the total area of North Carolina is inland water?  
A 0.07%  
B 0.7%  
C 7%  
D 70%

12 Mr. Krezminski bought a new car for $18,285. If the sales tax is 7%, what is the approximate amount he will pay in sales tax?  
A $1.40  
B $14.00  
C $140.00  
D $1,400.00
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.03 Compare and order rational numbers.

1 A text on the geography of North Carolina stated that the Piedmont makes up about \( \frac{9}{20} \) of the total land area, the Atlantic Coastal area makes up about 45\% of the total area, and the Mountain region makes up about 0.1 of the area. Which of the following best compares the areas of the regions from greatest to least area?
   A Atlantic Coastal, Piedmont, Mountain
   B Piedmont, Atlantic Coastal, Mountain
   C Mountain, Atlantic Coastal, Piedmont
   D Piedmont and Atlantic Coastal are the same, Mountain

2 Which list of numbers is in order from least to greatest?
   A 17\%, 0.213, 0.23, \( \frac{3}{5}, \frac{18}{25} \)
   B 17\%, 0.213, 0.23, \( \frac{18}{25}, \frac{3}{5} \)
   C 17\%, 0.23, 0.213, \( \frac{3}{5}, \frac{18}{25} \)
   D 0.213, 0.23, \( \frac{3}{5}, \frac{18}{25}, 17\% \)

3 Four friends compared the change they received after buying lunch in the school cafeteria. Angelina has 28 cents, Joaquin has 43\% of a dollar, Brendon has $0.39, and Mikaela has \( \frac{1}{20} \) of a dollar. Which list shows the friends in order according to who has the greatest amount of change to who has the least amount of change?
   A Joaquin, Brendon, Angelina, Mikaela
   B Brendon, Angelina, Mikaela, Joaquin
   C Mikaela, Angelina, Brendon, Joaquin
   D Joaquin, Mikaela, Brendon, Angelina

4 Which statement is true?
   A \( \frac{2}{5} > 40\% \)
   B \( \frac{5}{8} < 60\% \)
   C 14\% = \( \frac{2}{7} \)
   D \( \frac{18}{25} = 72\% \)

5 Janay is making a recipe that calls for \( 2\frac{1}{2} \) cups of flour. Which amount of flour should she use?
   A 2.1 cups
   B 2.25 cups
   C 2.5 cups
   D 2.75 cups
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.03 (continued)

6 Which is the least number in this list?
\[ \frac{2}{3}, \frac{3}{4}, \frac{1}{2}, \frac{8}{9} \]

A \( \frac{2}{3} \)  
B \( \frac{3}{4} \)  
C \( \frac{1}{2} \)  
D \( \frac{8}{9} \)

6 __________

7 Which list of numbers is in order from greatest to least?

A \( \frac{7}{4}, \frac{3}{4}, \frac{1}{2}, \frac{9}{10} \)  
B \( \frac{2}{2}, \frac{3}{4}, \frac{1}{10}, \frac{7}{4} \)  
C \( \frac{7}{4}, \frac{3}{4}, \frac{9}{10}, \frac{1}{2} \)  
D \( \frac{2}{2}, \frac{3}{4}, \frac{1}{2}, \frac{7}{4} \)

7 __________

8 Which statement is true?

A \( \frac{2}{3} > \frac{6}{7} \)  
B \( \frac{2}{3} < \frac{6}{7} \)  
C \( \frac{2}{3} = \frac{6}{7} \)  
D \( \frac{2}{3} = \frac{4}{9} \)

8 __________

9 Which statement is true?

A \( 0.75 < 8.2\% \)  
B \( 28\% < \frac{7}{25} \)  
C \( 2.05 > 2.06 \)  
D \( \frac{11}{4} < \frac{7}{2} \)

9 __________

10 Mr. Dabenow divided his science class into 4 teams, each of which will present a project at the end of the semester. The table shows how much of the project each team had completed at the end of 5 weeks. Which list shows the team projects in order from least completed to most completed?

A Climate, Oceans, Sea Life, Energy  
B Sea Life, Energy, Oceans, Climate  
C Oceans, Climate, Energy, Sea Life  
D Energy, Sea Life, Oceans, Climate

10 __________

<table>
<thead>
<tr>
<th>Team</th>
<th>Amount Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oceans</td>
<td>0.37</td>
</tr>
<tr>
<td>Sea Life</td>
<td>9/25</td>
</tr>
<tr>
<td>Climate</td>
<td>38%</td>
</tr>
<tr>
<td>Energy</td>
<td>7/20</td>
</tr>
</tbody>
</table>
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.03 (continued)

11 Which is the greatest number?
   A 9.7
   C 9.72
   B 9.67
   D 9.07

12 Which statement is true?
   A \( \frac{1}{3} = 0.3 \)
   B \( \frac{1}{3} = 0.3 \)
   C \( \frac{1}{3} > 0.3 \)
   D \( \frac{1}{3} < 0.3 \)

13 Which number would be graphed between \( X \) and \( Y \) on the number line shown?
   
   ![Number Line Diagram]
   
   A \( \frac{3}{2} \)
   B \( \frac{19}{10} \)
   C \( \frac{21}{10} \)
   D \( \frac{27}{10} \)

14 Which number would be graphed to the right of point \( A \) on the number line shown?
   
   ![Number Line Diagram]
   
   A \( \frac{23}{12} \)
   B \( \frac{5}{4} \)
   C \( \frac{9}{10} \)
   D \( \frac{17}{12} \)

15 Which statement is true?
   A \(-4 < 4\)
   B \(-4 > \frac{1}{4}\)
   C \(4 < -4.4\)
   D \(\frac{1}{4} = -\frac{4}{1}\)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.04 Develop fluency in addition, subtraction, multiplication, and division of non-negative rational numbers. Analyze computational strategies. Describe the effect of operations on size. Estimate the results of computations. Judge the reasonableness of solutions.

1. Members of an outdoor club decided to hike the North Carolina section of the Bartram Trail near Highlands. The challenging trail has an elevation gain of about 311.7 meters and is 9.17 kilometers in length. The group hiked 5.4 kilometers before they stopped for lunch. How can they determine the distance to the end of the trail?
   A. Subtract 5.4 from 9.17.
   B. Add 5.4 to 9.17.
   C. Subtract the sum of 5.4 and 9.17 from 311.7.
   D. Divide 9.17 by 5.4.

2. In Sonya’s health class, \( \frac{3}{4} \) of the students said they use sunscreen when they go to the beach. Out of the students who use sunscreen, \( \frac{1}{3} \) said that they use an SPF rating of 30+. How can you determine the fraction of students in the class who use a sunscreen with an SPF rating of 30+ when they go to the beach?
   A. Rename the fractions with 12 as the least common multiple, then add the fractions.
   B. Rename the fractions with 12 as the least common multiple, then subtract the smaller fraction from the larger.
   C. Multiply \( \frac{3}{4} \) by the reciprocal of \( \frac{1}{3} \), then simplify.
   D. Multiply \( \frac{3}{4} \) and \( \frac{1}{3} \), then simplify.

3. Harmon needs to cut a 9\( \frac{3}{4} \)-inch strip of balsa wood into 3 pieces. Which strategy should he use to determine the length of each piece?
   A. \( \frac{4}{39} \times 3 \)
   B. \( \frac{39}{4} \times 3 \)
   C. \( \frac{31}{4} \times \frac{1}{3} \)
   D. \( \frac{39}{4} \times \frac{1}{3} \)

4. Which describes the result of dividing \( \frac{1}{2} \) by \( \frac{3}{4} \)?
   A. The quotient will be greater than both fractions.
   B. The quotient will be less than both fractions.
   C. The quotient will be less than \( \frac{1}{2} \).
   D. The quotient will be greater than \( \frac{1}{2} \) and less than \( \frac{3}{4} \).
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.04 (continued)

5 Which describes the product of a positive fraction and its reciprocal?
   A The product is 1.
   B The product is less than 1.
   C The product is greater than 1.
   D The product is equal to the positive fraction.

6 Which describes the product of two positive decimals that are each less than 1?
   A The product is greater than either of the decimals.
   B The product is less than either of the decimals.
   C The product is greater than one of the decimals and less than the other.
   D The product is sometimes a whole number.

7 Mr. Jimenez bought 12 gallons of gasoline at a station in Fayetteville. The gas cost $1.569 cents per gallon. About how much did he pay for the gas?
   A $10
   B $15
   C $20
   D $25

8 The table shows how much fabric Kyra needs to make a costume for a school play. About how many yards of fabric should Kyra buy?

<table>
<thead>
<tr>
<th>Fabric (yards)</th>
</tr>
</thead>
<tbody>
<tr>
<td>skirt</td>
</tr>
<tr>
<td>blouse</td>
</tr>
<tr>
<td>sash</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>2 1/4</td>
</tr>
<tr>
<td>5/8</td>
</tr>
<tr>
<td>2/3</td>
</tr>
</tbody>
</table>

   A 1 yards
   B 3 yards
   C 5 yards
   D 7 yards

9 Which is the best estimate of 4.8 ÷ 1.8?
   A 3.5
   B 3
   C 2.5
   D 2
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 1.04** (continued)

10 Mr. Sandoval has a 37-foot rope that he wants to cut into 5 1/2-foot sections. How many complete sections can he cut from the rope?

- A 2
- B 4
- C 6
- D 8

11 Elsa bought a bird feeder for $15.99 plus 7% tax. She paid for the bird feeder with a $20 bill. What is a reasonable amount that she should expect to get back as change from her purchase?

- A under $2
- B nearly $3
- C just under $3.50
- D nearly $4

12 Jenna has a recipe for spaghetti sauce that calls for 2 1/2 cups of mushrooms. If she makes 1/3 of the recipe, what is a reasonable amount of mushrooms she should use?

- A 2/3 cups
- B 5/6 cups
- C 1 1/6 cups
- D 1 1/3 cups

13 Tickets to the planetarium cost a total of $83.60 for a group of 22. If each ticket costs the same, what is the cost of one ticket?

- A $2.20
- B $2.80
- C $3.20
- D $3.80

14 Elinor bought 4 CDs at a music store, ranging in price from $4.99 to $14.99. What is a reasonable estimate for the cost of the 4 CDs?

- A $40
- B $25
- C $20
- D $16
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.05 Develop fluency in the use of factors, multiples, exponential notation, and prime factorization.

1. What is the prime factorization of 42?
   A. $2 \times 21$
   B. $2 \times 3 \times 7$
   C. $3 \times 7^2$
   D. $1 \times 7 \times 6$

2. Which number has $2^4 \times 3$ as its prime factorization?
   A. 24
   B. 30
   C. 48
   D. 96

3. What is the prime factorization of 84?
   A. $2^2 \times 3 \times 7$
   B. $2^2 \times 1 \times 21$
   C. $2^3 \times 10 \times 4$
   D. $2^6$

4. The director of a coastline preservation group handed out supplies to a group of sixth grade students interested in learning how to restore the coastal habitat. The director gave out 54 bags to collect trash and 36 containers of wetland grasses to plant. If each student received an equal number of trash bags and an equal number of wetland grasses, what is the greatest number of students at the preservation site?
   A. 9
   B. 18
   C. 36
   D. 45

5. Gelisa plays in a soccer game every 3 days and in a basketball game every 4 days. If she plays in a soccer game and a basketball game on the same day, how many days will it be before she plays in both games on the same day again?
   A. 30 days
   B. 24 days
   C. 12 days
   D. 7 days
6 Mr. Yeager wants to fence a vegetable garden to keep rabbits from eating his plants. The garden is rectangular and has an area of 72 square feet. Which of the following are the possible dimensions of the garden?

A. 20 feet × 52 feet
B. 15 feet × 5 feet
C. 12 feet × 5 feet
D. 9 feet × 8 feet

7 What is the least common multiple of 6 and 8?

A. 14
B. 24
C. 48
D. 72

8 The governor of a state is elected every 4 years. The governor appoints a commission to study land quality every 6 years. If both events occurred in 2002, when will both occur in the same year again?

A. 2006
B. 2008
C. 2012
D. 2014

9 A bus for route A arrives at a bus stop every 9 minutes. A bus for route B arrives at the same bus stop every 12 minutes. At 9 A.M., both buses arrive simultaneously. How often do the buses arrive at the bus stop at the same time?

A. every 3 minutes
B. every 21 minutes
C. every 36 minutes
D. every 45 minutes

10 Lillian stays after school every Wednesday to study math. She stays after school every other Monday to meet with the Spanish club. On every third Tuesday, she stays after school to help stack books in the library. This week she stayed after school 3 days. When will she stay after school 3 days in the same week again?

A. in 2 weeks
B. in 3 weeks
C. in 4 weeks
D. in 6 weeks
OBJECTIVE 1.05 (continued)

11 Connor has 12 buffalo nickels, 6 Indian head pennies, and 15 mercury dimes in his coin collection. He wants to organize the coins into rows so that the number of nickels in each row is the same, the number of pennies in each row is the same, and the number of dimes in each row is the same. How many of each coin should he put in each row?

A 2 nickels, 3 pennies, and 3 dimes
B 3 nickels, 2 pennies, and 5 dimes
C 4 nickels, 3 pennies, and 5 dimes
D 4 nickels, 2 pennies, and 5 dimes

12 A nursery in Asheville has 18 beech trees, 24 pine trees, and 30 maple trees. The manager of the nursery wants each group of trees to have the same number of trees in each row. If the nursery lays out the minimum number of rows, how many beech trees will be in each row?

A 3
B 6
C 9
D 18

13 What is the simplified form of $\frac{y^6}{y^9}$?

A $y^{-3}$
B $y^{-15}$
C $y^{15}$
D $y^3$

14 Which expression is equivalent to $(2x^2y)^3$?

A $6x^6y$
B $6x^6y^3$
C $8x^6y^3$
D $8x^8y^3$

15 Which expression is equivalent to $4x \cdot 2 \cdot 4x \cdot 3x^2 \cdot x$?

A $96x^5$
B $96x^2$
C $48x^4 + 2x$
D $48x^5 + 2$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.05 (continued)

16 What is the simplified form of $\frac{-6b^8}{-3b^4}$?
   A. $-2b^4$
   B. $2b^2$
   C. $2b^{12}$
   D. $2b^4$

17 Which expression is equivalent to $2a(3ab^2)$?
   A. $6ab^2$
   B. $6a^2b^2$
   C. $18a^6b^2$
   D. $18a^2b^2$

18 What is the simplified form of $\frac{-2x^{12}}{x^6}$?
   A. $-x^2$
   B. $-2x^2$
   C. $-2x^6$
   D. $-3x^6$

19 What expression is the product of $-2c^2 \cdot c^2 \cdot 3$?
   A. $-6c^4$
   B. $-6c$
   C. $-6$
   D. $5c^4$

20 What is the simplified form of $\frac{p^5}{p^5}$?
   A. 0
   B. 1
   C. $p$
   D. $p^{10}$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 1.06** Use exponential, scientific, and calculator notation to write very large and very small numbers.

1. In the 2000 census, the population of North Carolina, rounded to the nearest ten thousand, was $8.05 \times 10^6$. Which of the following is another way to represent the population?
   - A 0.805 million
   - B 8.05 million
   - C 80.5 million
   - D 805 million

2. The mass of *Tyrannosaurus Rex* was approximately $1 \times 10^4$ kilograms. What was the mass of the dinosaur represented in standard notation?
   - A 100 kilograms
   - B 1,000 kilograms
   - C 10,000 kilograms
   - D 100,000 kilograms

3. The smallest bird is a bee hummingbird. It weighs about $5.6 \times 10^{-2}$ ounces. Which is another way to represent this weight?
   - A 0.0056 ounce
   - B 0.056 ounce
   - C 0.56 ounce
   - D 5.6 ounces

4. The slowest fish is a sea horse at 0.01 mile per hour. What is this speed written in scientific notation?
   - A $0.1 \times 10^{-1}$
   - B $1 \times 10^{-1}$
   - C $1 \times 10^{-2}$
   - D $1 \times 10^2$

5. Jonathan has a computer that has $2.3 \times 10^9$ bytes of memory. If he enters this number on his calculator, what will the display read?
   - A $2.3E+9$
   - B $2.3E-9$
   - C $23E+9$
   - D $23E-9$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.06 (continued)

6 The display on a calculator reads $1.6 \times 10^{-12}$. What is this number written in scientific notation?
   - A $1.6 \times 10^{-12}$
   - B $0.16 \times 10^{-12}$
   - C $0.016 \times 10^{-12}$
   - D $0.000000000016 \times 10$

7 If the display on a calculator reads $3.05 \times 10^6$, what is this number written in standard notation?
   - A 305,000
   - B 3,050,000
   - C 30,500,000
   - D 305,000,000

8 A calculator displays the number $2.5 \times 10^{-1}$. Mr. Nguyen told his class that this number is the length of a North American feather-winged beetle in millimeters. What is the length of the beetle in standard notation?
   - A 25 millimeters
   - B 2.5 millimeters
   - C 0.25 millimeter
   - D 0.025 millimeter

9 Students in the walking club at Midtown Middle School keep a log of how many miles they walk each week. After 6 months, Francesca’s log shows that she has walked about 73 miles. How many miles is this in standard notation?
   - A 21 miles
   - B 147 miles
   - C 343 miles
   - D 2,187 miles

10 The Mountains-to-Sea trail in North Carolina will stretch about 1,000 miles from the Great Smoky Mountains National Park to the Outer Banks. Which of the following represents the distance in exponential notation?
   - A $10^2$ miles
   - B $10^3$ miles
   - C $10^4$ miles
   - D $10^5$ miles
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.06 (continued)

11 The sixth grade class at Piedmont Middle School collected $5 \times 10^3$ cans the first week of the annual food drive. How many cans did they collect the first week?
   A 15
   B 25
   C 125
   D 625

12 A volleyball competition at the beach drew about $6 \times 10^4$ spectators. How many people showed up to watch the competition?
   A 216
   B 1,296
   C 7,776
   D 4,096

13 A traveling carnival claimed that they had $10^6$ paid admissions in 9 months. If each admission paid $3, how much did they earn?
   A $30,000
   B $300,000
   C $3,000,000
   D $30,000,000

14 The minimum distance from Earth to the Sun is $9.1 \times 10^7$ miles. The maximum distance is $9.45 \times 10^7$ miles. What is the difference between the minimum and maximum distances?
   A 3,500 miles
   B 35,000 miles
   C 350,000 miles
   D 3,500,000 miles

15 Great white sharks can weigh over $4 \times 10^3$ pounds. A whale shark, which can open its mouth 5 feet, can weigh as much as $3.2 \times 10^4$ pounds. How many more pounds does a large whale shark weigh than a great white shark?
   A 80 pounds
   B 1,800 pounds
   C 2,800 pounds
   D 28,000 pounds
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.06 (continued)

16 The diameter of Earth is about $1 \times 10^4$ kilometers. The diameter of the Moon is about $3 \times 10^3$ kilometers. How much larger is the diameter of Earth than the Moon?
   A 700 kilometers
   B 1,000 kilometers
   C 2,000 kilometers
   D 7,000 kilometers

17 According to the 2000 census, about $3.9 \times 10^6$ males and about $4.1 \times 10^6$ females lived in North Carolina. How many more females than males lived in North Carolina in 2000?
   A 2,000
   B 20,000
   C 200,000
   D 2,000,000

18 Raleigh-Durham airport had about $6.4 \times 10^5$ passengers in November 2002. In December 2002, they had about $6.8 \times 10^5$ passengers. How many passengers traveled through the airport in November and December?
   A 40,000
   B 132,000
   C 400,000
   D 1,320,000

19 The speed of sound in seawater is $1.531 \times 10^3$ meters per second. How far will sound travel in seawater in 1 minute?
   A 91,860 meters
   B 15,310 meters
   C 9,186 meters
   D 1,531 meters

20 The bird population at a sanctuary increased about 30% from a total of about $4.5 \times 10^5$ birds of all species. What is the bird population now?
   A about 307 birds
   B about 332 birds
   C about 1,331 birds
   D about 5,324 birds
OBJECTIVE 1.07 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

1. For which situation would it be most useful to work a simpler problem?
   A. Find the sum of all counting numbers from 1 to 100.
   B. Find the difference in temperature between \(12^\circ C\) and \(-4^\circ C\).
   C. Find the area of a throw rug with a radius of 1.25 feet.
   D. Round 2,369,217 to the nearest ten thousand.

2. Mr. Ekeledo wants to determine the number of possible ways that he can make a seating arrangement for 4 students. Which strategy would be most helpful?
   A. guess and test
   B. make an organized list
   C. work backward
   D. look for extraneous information

3. For which situation would it be most useful to work backward?
   A. You want to know the time you should start your homework and you know the time you go to bed and the time it takes to do your chores.
   B. You want to know how many quarters and nickels you used to purchase a book that cost $1.80.
   C. You want to find how many ways you can arrange 5 books on a shelf.
   D. You want to determine when two plants will reach the same height if one grows at a rate of 5 centimeters per week and the other grows at a rate of 3 centimeters per week.

4. Suppose you want to know how many layers of paper you will have after you fold a piece of notebook paper 8 times. Which of the following strategies would be the least useful?
   A. find a pattern
   B. work a simpler problem
   C. make a table
   D. work backwards
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.07 (continued)

5 A concert hall employs 3 ushers for every 120 people attending a concert. Suppose you know that 12 ushers were hired. You want to know how many people attended the concert. Which would be the most reasonable strategy to use?
   A Use a table to find a pattern.
   B Work backward from 12 ushers to 3 ushers.
   C Make a guess and test the guess until you get the right number.
   D Try to break the problem into a simpler problem.

6 For which situation would a guess and test strategy work best?
   A The area of a rectangle is 180 square centimeters and its length is twice as long as its width. You need to find the length and width of the rectangle.
   B You need to find the original price of a baseball card. You know its current value and that the current value is 3 times its value last year, which was \( \frac{1}{4} \) its value the previous year.
   C A savings account earns 2.5% interest every quarter. The initial deposit was $250. You need to know the balance after two years.
   D The 18 players on two baseball teams shake hands after a game. You need to find the total number of handshakes.

7 The beaches in North Carolina are the northernmost nesting areas for loggerhead turtles. Adult loggerheads weigh about 300 pounds. Females lay about 120 eggs to a nest. If an adult female lays 6 nests in a season, and all the eggs hatch, about how many hatchlings is that?
   A 20
   B 180
   C 720
   D 1,800

8 Two tickets to the fair cost $11.50, four tickets cost $23.00, and six tickets cost $34.50. What is the most likely cost of 14 tickets?
   A $46.00
   B $57.50
   C $69.00
   D $80.50

9 Tyesha bought shoes on sale for $52.80. She bought a volleyball for $17.99. A sign at the store advertised volleyball nets for $22.49. About how much did she spend if she paid 7% sales tax on the two items?
   A about $70
   B about $75
   C about $90
   D about $96
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.07 (continued)

10 Riana was offered a job at a tutoring center. She earned $7.25 per hour the first year and $8.15 per hour the second year. If her hourly wages increase at the same rate each year, how much will she earn during her sixth year of work?

A $15.40   
B $12.65   
C $11.75   
D $10.85

11 Timothy and his family are planning a camping trip to Hanging Rock. The trip is 220 miles. They plan to divide the driving into two segments with a break for lunch in between. If the distance they travel before lunch is 60 miles more than the distance they travel after lunch, how many miles do they plan to drive before lunch?

A 160 miles   
B 140 miles   
C 80 miles   
D 60 miles

12 A microbiologist is growing cells in a culture. If she starts with 2 cells on the first day and the cells triple every day thereafter, how many cells will she have on the fifth day?

A 30   
B 54   
C 150   
D 162

13 Maya, Tomas, Dakota, and Kylie are standing in a cafeteria line at school. Maya stands behind Dakota. Dakota is not first in line. Kylie is neither first nor last in line. Who is third in line?

A Dakota   
B Tomas   
C Maya   
D Kylie

14 Rikki and Logan have $6.00 left after an afternoon of playing miniature golf. They spent half of their money to pay for two games. After they paid for the games, they spent $1 \frac{1}{3}$ of the money they had left on refreshments. How much money did they take to the miniature golf course?

A $36   
B $24   
C $18   
D $12
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 1.07 (continued)

15 Carlos is saving money to buy a bicycle that costs $175. The table shows how much money Carlos plans to save each week. How many weeks will it take Carlos to save enough money to buy the bicycle?

<table>
<thead>
<tr>
<th>Week</th>
<th>Amount Saved ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

A 6 weeks  
B 7 weeks  
C 8 weeks  
D 9 weeks

16 At the mall last week, Marlena spent the money she earned babysitting. She spent about $14 on a CD, nearly $37 on a pair of pants, $10 on earrings, and just over $15 on lunch for herself and a friend. She has about $12 left. What is the approximate amount of money Marlena earned from baby-sitting?

A $95  
B $85  
C $75  
D $65

17 The chart shows how many turtles and salamanders Chieno saw on a trip to Cape Hatteras. If she saw a total of 109 turtles, salamanders, and frogs, how many frogs did she see?

Turtles and Salamanders

<table>
<thead>
<tr>
<th>Turtles</th>
<th>Salamanders</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td></td>
</tr>
<tr>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>

A 42  
B 57  
C 67  
D 75

18 Alexa’s home office is upstairs in her house. She estimates that she climbs the 16 stairs ten times each day. About how many stairs will Alexa climb in her house in a 30-day month?

A 4,800  
B 4,200  
C 2,800  
D 2,400
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 2.01 Estimate and measure length, perimeter, area, angles, weight, and mass of two- and three-dimensional figures, using appropriate tools.

1. What is the measure of \( \angle ABC \)?
   - A 48°
   - B 62°
   - C 132°
   - D 162°

2. Which angle has a measure of about 112°?
   - A
   - B
   - C
   - D

3. Which angle has a measure of 40°?
   - A \( \angle RUS \)
   - B \( \angle RUV \)
   - C \( \angle TUV \)
   - D \( \angle QUV \)

4. If an angle has a measure of 22°, what kind of angle is it?
   - A acute
   - B right
   - C obtuse
   - D straight

5. Which of the following is an obtuse angle?
   - A
   - B
   - C
   - D
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 2.01 (continued)

6 What is the length of the line segment in inches?

(A) \(2 \frac{1}{8}\) inches  
(B) \(2 \frac{1}{4}\) inches  
(C) \(2 \frac{1}{2}\) inches  
(D) \(5 \frac{3}{4}\) inches

7 What is the length of the line segment in centimeters?

(A) 4.5 centimeters  
(B) 17.5 centimeters  
(C) 45 centimeters  
(D) 1.75 centimeters

8 The figure shows two trails. What is the difference in the length of the Oak Ridge Trail and the Highwater Trail?

(A) \(\frac{7}{8}\) mile  
(B) \(\frac{15}{16}\) mile  
(C) 1 mile  
(D) 1 \(\frac{15}{16}\) miles

9 Which of the following is closest to the length of the pencil in the drawing?

(A) 7 inches  
(B) 3 inches  
(C) 2.75 inches  
(D) 2.5 inches

10 What is the perimeter of the triangle?

(A) 15 centimeters  
(B) 14 centimeters  
(C) 3.75 centimeters  
(D) 3 centimeters
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 2.01 (continued)**

11 Use the unit of length to measure the perimeter of the figure. What is the approximate perimeter of the figure?

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

12 Mrs. Russell bought fencing for a rectangular rose garden that measures 12 feet by 10 feet. After she bought the fencing, she decided to increase the dimensions of the garden to 18 feet by 12 feet. If she wants to install fencing around the garden, how much more fencing does she need to buy?

A 8 feet  
B 16 feet  
C 96 feet  
D 104 feet

13 What is the area of the triangle?

A 36 square units  
B 40 square units  
C 72 square units  
D 80 square units

14 Mr. Diamond has two pond hoses. One has a diameter of 20 millimeters. The other has a diameter of 32 millimeters. What is the difference in the area of the openings of the two hoses?

A about 19 square millimeters  
B about 38 square millimeters  
C about 490 square millimeters  
D about 1,960 square millimeters

15 Tricia has an 8-inch by 10-inch photograph that she enlarged to 12 inches by 15 inches. How much more wall space does the enlarged photograph require?

A 18 square inches  
B 90 square inches  
C 100 square inches  
D 260 square inches
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 2.01 (continued)**

16 Using the unit of measure, what is the approximate area of the rectangle?  

```
30 units
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A  42 square units  
B  54 square units  
C  90 square units  
D  810 square units

17 The scale is holding only a cantaloupe. What does it weigh?  

```
6 pounds
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A  2 pounds 2 ounces  
B  2 pounds 5 ounces  
C  2 pounds 8 ounces  
D  3 pounds 2 ounces

18 The mass of 1 paper clip is about 1 gram. The mass of 1,000 paper clips is about 1 kilogram. What is the best estimate of the mass of 6,250 paper clips?  

A  625 grams  
B  625 kilograms  
C  62.5 kilograms  
D  6.25 kilograms

19 Marcello wants to buy a box of chocolates from Belgium. How many chocolates can he expect to find in a 500-gram box if each chocolate weighs between 18 and 22 grams?  

A  around 20  
B  around 25  
C  between 28 and 30  
D  over 30

20 A Johnston County farmer raises sweet potatoes that he ships to market. If 6 medium sweet potatoes weigh about 3 pounds, then about how many medium sweet potatoes will fit in a box that has a 40-pound limit?  

A  20  
B  80  
C  100  
D  240
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Objective 2.02 Solve problems involving perimeter/circumference and area of plane figures.

1. A carpenter built a gazebo with a floor the shape of an octagon. If each side of the octagon measures $2\frac{1}{2}$ feet, what is the perimeter of the gazebo floor?
   - A 2.4 feet
   - B 3.2 feet
   - C 15 feet
   - D 20 feet

2. Riley bought a pizza for $8.99. If the diameter of the pizza is 12 inches, what is the approximate price of the pizza per square inch?
   - A $0.02
   - B $0.08
   - C $0.13
   - D $0.75

3. Payton has a circular rug next to her bed. The circumference of the rug is 70 inches. What is the approximate area of the floor that the rug covers?
   - A about 1,600 square inches
   - B about 490 square inches
   - C about 390 square inches
   - D about 280 square inches

4. A cylindrical display case has a base with a diameter of 27 centimeters. Rafael wants to put the display case on a table. How much area of the table will the display case occupy?
   - A about 185 square centimeters
   - B about 170 square centimeters
   - C about 573 square centimeters
   - D about 2,290 square centimeters

5. Mr. Archer built a hexagonal birdhouse with a perimeter of 42 centimeters. What is the length of each side of the birdhouse?
   - A 5.25 centimeters
   - B 6 centimeters
   - C 7 centimeters
   - D 8.4 centimeters
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 2.02 (continued)**

6 Amanda found a sand dollar when she visited Holden Beach. The sand dollar was about 8 centimeters in diameter. What was the circumference of the sand dollar?
   A about 25 centimeters
   B about 50 centimeters
   C about 75 centimeters
   D about 100 centimeters

7 Adrian uses a plastic hoop to teach his dog Rufus to jump. The hoop has a circumference of 2.8 meters. What is the diameter of the hoop to the nearest hundredth of a meter?
   A 0.45 meter
   B 0.89 meter
   C 0.94 meter
   D 1.89 meters

8 An architect designed a triangular stained glass window for an art studio. The perimeter of the window is 86 inches and the base is 30 inches. What is the measure of each side of the window?
   A 58 inches
   B 56 inches
   C 29 inches
   D 28 inches

9 Mrs. Jesse imported triangular stepping stones for a wildflower garden she planted in her backyard. The base of each stepping stone is 27 centimeters. The height of each stone is 22 centimeters. What is the area of each stone?
   A 38 square centimeters
   B 76 square centimeters
   C 297 square centimeters
   D 594 square centimeters

10 Nina wants to have a custom pool cover made for a rectangular swimming pool that measures 9.5 meters by 6.2 meters. How much fabric will it take to cover the pool?
   A 15.7 square meters
   B 29.45 square meters
   C 31.4 square meters
   D 58.9 square meters
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 2.02 (continued)

The figure shows the dimensions of Mrs. Pena's kitchen. Use the figure to answer Questions 1–3.

11 Mrs. Pena wants to re-tile her kitchen floor. How many square feet of tile will she need?
   A  198 square feet
   B  345 square feet
   C  441 square feet
   D  537 square feet

12 The manufacturer of the square-foot tiles Mrs. Pena wants to use estimated that it would cost about $5,600 to buy enough tiles. About how much does each tile cost?
   A  about $10
   B  about $12
   C  about $16
   D  about $27

13 If Mrs. Pena puts trim around the edges of the floor, how many feet of trim will she need?
   A  63 feet
   B  79 feet
   C  85 feet
   D  91 feet

14 Samantha is helping her father put weather stripping around a bay window that measures 4.35 meters by 3.5 meters. They found some weather stripping in the garage that had been cut into 2.5-meter lengths. How many of these lengths will they need for the bay window?
   A  4
   B  5
   C  6
   D  7

15 A box of grass seed will cover 150 square feet. If a rectangular lot is 38 feet long and 22 feet wide, how many boxes of seed will it take to cover the lot?
   A  6
   B  5
   C  2
   D  1
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 2.02 (continued)

The figure shows a circular koi pond at a nature center. It has a 2-foot wide path of pebbles installed around it. Use the figure to answer Questions 16–20.

16 What is the outside circumference of the path around the pond to the nearest tenth?
   A 28.3 feet
   B 34.6 feet
   C 56.5 feet
   D 69.1 feet

17 What is the total area of the path and the pond to the nearest square foot?
   A 64 square feet
   B 95 square feet
   C 254 square feet
   D 380 square feet

18 The head gardener at the nature center hired a contractor to deliver and install the pebbles on the path. If the total cost to install the pebbles was $325.00, about how much did the pebbles cost per square foot?
   A $0.95
   B $1.50
   C $5.75
   D $12.94

19 The planning commission at the nature center suggested that the diameter of the koi pond be doubled. What effect would this have on the area of the pond?
   A The area would double.
   B The area would quadruple.
   C The area would increase 8 times.
   D The area would increase 16 times.

20 By how many times would the circumference of the pond increase if its diameter is doubled?
   A 2
   B 4
   C 6
   D 8
OBJECTIVE 3.01 Identify and describe the intersection of figures in a plane.

For Questions 1–5, use the figure.

1 Which of the following are corresponding angles?
   A $\angle 1$ and $\angle 9$
   B $\angle 1$ and $\angle 4$
   C $\angle 1$ and $\angle 16$
   D $\angle 1$ and $\angle 5$

2 Which of the following are alternate interior angles?
   A $\angle 10$ and $\angle 5$
   B $\angle 15$ and $\angle 7$
   C $\angle 7$ and $\angle 11$
   D $\angle 8$ and $\angle 9$

3 Which of the following are supplementary angles?
   A $\angle 10$ and $\angle 5$
   B $\angle 4$ and $\angle 7$
   C $\angle 1$ and $\angle 3$
   D $\angle 7$ and $\angle 11$

4 Which of the following are alternate exterior angles?
   A $\angle 9$ and $\angle 12$
   B $\angle 10$ and $\angle 8$
   C $\angle 1$ and $\angle 8$
   D $\angle 16$ and $\angle 4$

5 If the measure of $\angle 10$ is 70°, what is the measure of $\angle 3$?
   A 20°
   B 70°
   C 90°
   D 110°
OBJECTIVE 3.01 (continued)

For Questions 6–10, use the figure.

6 Which angle corresponds to $\angle 1$?
   A $\angle 2$
   B $\angle 4$
   C $\angle 5$
   D $\angle 10$

7 Which line is parallel to line $a$?
   A line $b$
   B line $c$
   C line $d$
   D line $e$

8 Which pair of lines are perpendicular?
   A line $a$ is perpendicular to line $b$
   B line $a$ is perpendicular to line $c$
   C line $b$ is perpendicular to line $c$
   D line $b$ is perpendicular to line $d$

9 Which pair of angles are complementary?
   A $\angle 1$ and $\angle 3$
   B $\angle 6$ and $\angle 7$
   C $\angle 5$ and $\angle 9$
   D $\angle 8$ and $\angle 11$

10 Which pair of angles are vertical angles?
    A $\angle 1$ and $\angle 2$
    B $\angle 3$ and $\angle 4$
    C $\angle 5$ and $\angle 6$
    D $\angle 8$ and $\angle 10$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.01 (continued)

For Questions 11–15, use the figure at the right.

11 What are the coordinates of the intersection of the circle, the given diameter, the square, and the y-axis?
   A (0, 4)  B (4, 0)  C (4, 4)  D (4, 8)

12 What are the coordinates of the intersection of the circle, the diameter, a triangle, and BC?
   A (8, 4)  B (8, 8)  C (8, 0)  D (4, 8)

13 What is the length of the diameter?
   A 4 units  B 5 units  C 6 units  D 8 units

14 Which of the following describes the point at (4, 8)?
   A the center of the circle  B an intersection of the circle, square, and given diameter  
   C an intersection of the circle, square, and triangle  D an intersection of the circle, square, triangle, and given diameter

15 Which statement is not true?
   A \( AB \) is perpendicular to the given diameter.  
   B \( BC \) is perpendicular to \( CD \).  
   C \( CD \) is parallel to the given diameter.  
   D \( AD \) and \( BC \) are parallel.
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.01 (continued)

For Questions 16–20, use the figure at the right.

16 Which coordinates are the intersection of the triangle, the circle, the rectangle, and the y-axis?
   A (0, 3)  
   B (3, 0)  
   C (3, 9)  
   D (6, 0)

17 Which of the following best describes the point located at (3, 0)?
   A an intersection of the rectangle and the triangle  
   B an intersection of the circle and the triangle  
   C an intersection of the circle, the diameter, the triangle, and the rectangle  
   D an intersection of the circle and the rectangle

18 Which statement best describes the given diameter?
   A The length of the diameter is 3 units.  
   B The diameter is also the base of the triangle.  
   C The diameter is also the altitude of the triangle.  
   D The diameter is located at (3, 3).

19 Which point is not an intersection of the diameter, the triangle, and the rectangle?
   A (3, 6)  
   B (3, 3)  
   C (0, 3)  
   D (6, 3)

20 How many figures intersect at (0, 6)?
   A 0  
   B 1  
   C 2  
   D 3
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.02 Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationships among them.

For Questions 1–5, use circle A.

1 What is \( \overline{AC} \) called?
   A radius
   B diameter
   C chord that is not a diameter
   D center

2 What is \( \overline{DC} \) called?
   A radius
   B diameter
   C chord that is not a diameter
   D center

3 What is \( \overline{BC} \) called?
   A radius
   B diameter
   C chord that is not a diameter
   D center

4 What is the center of the circle?
   A \( A \)
   B \( B \)
   C \( C \)
   D \( D \)

5 If \( AB = 12 \) centimeters, what does \( DC \) equal?
   A 6 centimeters
   B 12 centimeters
   C 24 centimeters
   D 144 centimeters
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.02** (continued)

For Questions 6–10, use circle V.

6 What is $\overline{VZ}$ called?  
A diameter  
B radius  
C apothem  
D chord that is not a diameter

7 What is $\overline{YW}$ called?  
A diameter  
B radius  
C apothem  
D chord that is not a diameter

8 What is $\overline{YS}$ called?  
A diameter  
B radius  
C apothem  
D chord that is not a diameter

9 Which statement is true?  
A $\overline{VW}$ is half of $\overline{YS}$  
B $\overline{YZ}$ is half of $\overline{YW}$  
C $\overline{VT}$ is perpendicular to $\overline{YW}$  
D $\overline{XY}$ is twice $\overline{YT}$

10 Which statement is true?  
A $\overline{YW}$ is less than $\overline{YV}$  
B $\overline{YW}$ is less than $\overline{YS}$  
C $\overline{YW}$ is less than $\overline{YX}$  
D $\overline{YW}$ is less than $\overline{YZ}$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.02 (continued)

For Questions 11–15, use the circle shown on the graph below.

11. What is the radius of this circle?
   A. 2 units   B. 3 units
   C. 4 units   D. 6 units

12. What is the diameter of this circle?
   A. 2 units   B. 3 units
   C. 4 units   D. 6 units

13. What is the circumference of this circle?
   A. $\pi$ units   B. $3\pi$ units
   C. $6\pi$ units   D. $9\pi$ units

14. What are the coordinates of the center of this circle?
   A. (3, 0)   B. (1, 4)
   C. (7, 1)   D. (4, 1)

15. What is the line segment called that has its endpoints at the points (1, 1) and (4, 4)?
   A. radius   B. diameter
   C. arc   D. chord that is not a diameter

16. Which statement is true?
   A. The center of a circle lies on every chord.
   B. The radius of a circle is the longest chord.
   C. The diameter of a circle is half the circumference.
   D. The diameter of a circle is twice the radius.
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.02 (continued)**

For Questions 17–21, use circle O shown in this figure.

![Diagram of a circle with points N, O, M, R, and Q labeled]

17 Which is a radius of the circle?

A  $MN$  
B  $MO$  
C  $OR$  
D  $NQ$

18 Which is a diameter of this circle?

A  $MN$  
B  $MO$  
C  $OR$  
D  $NQ$

19 Which is a chord of this circle that is not a diameter?

A  $MN$  
B  $MO$  
C  $OR$  
D  $NQ$

20 Which is the circumference of this circle?

A  $MNM$  
B  $NPQ$  
C  $\triangle MNP$  
D  $MN \cup NP \cup PM$

21 If $OR = 4$ inches and $RQ = 3$ inches, what does $MO$ equal?

A  3 inches  
B  4 inches  
C  7 inches  
D  12 inches
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.03** Transform figures in the coordinate plane and describe the transformation.

**For Questions 1 and 2, use the figure.**

1. Which transformation describes \( \triangle ABC \rightarrow \triangle DEF \)?
   A. translation  
   B. reflection across the \( x \)-axis  
   C. reflection across the \( y \)-axis  
   D. 180° rotation about the origin

2. Which general rule describes the transformation \( \triangle ABC \rightarrow \triangle DEF \)?
   A. \((x, y) \rightarrow (x + 5, y - 2)\)
   B. \(x\)- and \(y\)-coordinates change signs
   C. \(x\)-coordinates change signs, \(y\)-coordinates remain the same
   D. \(y\)-coordinates change signs, \(x\)-coordinates remain the same

**For Questions 3 and 4, use the figure.**

3. Which transformation describes \( RSTU \rightarrow R'S'T'U'' \)?
   A. 90° clockwise rotation  
   B. 180° clockwise rotation  
   C. translation  
   D. reflection over \( x \)-axis

4. What are the coordinates of \( R'S'T'U'' \)?
   A. \(R'(-1, -4), S'(3, -4), T'(4, 0), \) and \(U'(-3, -1)\)
   B. \(R'(-4, -1), S'(-4, 3), T'(0, 4), \) and \(U'(-1, -3)\)
   C. \(R'(-1, 4), S'(3, 4), T'(4, 0), \) and \(U'(-3, 1)\)
   D. \(R'(4, -1), S'(4, 3), T'(0, 4), \) and \(U'(1, -3)\)
For Questions 5–7, use the figure.

5 Triangle $PQR$ is translated 2 units right and 1 unit down. What are the coordinates of $P'Q'R'$?
   - A $P'(-2, -2), Q'(-1, 2),$ and $R'(1, -3)$
   - B $P'(-2, 0), Q'(-1, 2),$ and $R'(1, -1)$
   - C $P'(-3, 1), Q'(-2, 1),$ and $R'(0, -4)$
   - D $P'(-6, -2), Q'(-5, 2),$ and $R'(-3, -3)$

6 Which general rule describes $PQR \rightarrow P'Q'R'$?
   - A $(x, y) \rightarrow (x - 2, y + 1)$
   - B $(x, y) \rightarrow (x + 2, y - 1)$
   - C $(x, y) \rightarrow (x - 1, y + 2)$
   - D $(x, y) \rightarrow (x + 1, y - 2)$

7 If you use the same rule that describes $PQR \rightarrow P'Q'R'$ to translate $\triangle XYZ$, what will be the coordinates of $X'Y'Z'$?
   - A $X'(-1, 0), Y'(0, 5), Z'(3, 0)$
   - B $X'(0, 1), Y'(1, 6), Z'(4, 1)$
   - C $X'(2, -3), Y'(3, 2), Z'(6, -1)$
   - D $X'(3, -2), Y'(4, 3), Z'(7, -2)$

For Questions 8 and 9, use the figure.

8 If $S$ is reflected across the $y$-axis, what will be the coordinates of $S'$?
   - A $S'(2, -2)$
   - B $S'(2, 2)$
   - C $S'(-2, -2)$
   - D $S'(2, 1)$

9 If $S$ is reflected across the $x$-axis, what will be the coordinates of $S''$?
   - A $S'(-2, -2)$
   - B $S'(2, 2)$
   - C $S'(2, -2)$
   - D $S'(2, 1)$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.03** (continued)

10 If \( \triangle ABC \) is translated 3 units right and 4 units down, what will be the coordinates of \( \triangle A'B'C' \)?

A. \( A'(0, -2), B'(2, -2), \) and \( C'(2, -4) \)
B. \( A'(1, -1), B'(3, -1), \) and \( C'(3, -3) \)
C. \( A'(-6, 6), B'(-4, 6), \) and \( C'(-4, 4) \)
D. \( A'(-7, 5), B'(-5, 5), \) and \( C'(-5, 3) \)

For Questions 11 and 12, use the figure.

11 Which transformation describes \( \text{FGHI} \rightarrow \text{F'G'H'I'} \)?

A. reflection across \( x \)-axis
B. translation
C. \( 90^\circ \) clockwise rotation
D. \( 90^\circ \) counterclockwise rotation

12 Which general rule describes the transformation \( \text{FGHI} \rightarrow \text{F'G'H'I'} \)?

A. The \( x \) and \( y \)-coordinates change signs.
B. The \( y \)-coordinates change signs and the \( x \)-coordinates remain the same.
C. \( (x, y) \rightarrow (x + 1, y + 5) \)
D. \( (x, y) \rightarrow (x + 5, y + 1) \)

13 If \( \triangle MNP \) is reflected across the \( x \)-axis, what will be the coordinates of \( \triangle M'N'P' \)?

A. \( M'(-1, 3), N'(-4, 1), \) and \( P'(-5, 3) \)
B. \( M'(1, -3), N'(4, -1), \) and \( P'(5, -3) \)
C. \( M'(-1, -3), N'(-4, -1), \) and \( P'(-5, -3) \)
D. \( M'(1, 3), N'(4, 1), \) and \( P'(5, 3) \)
For Questions 14 and 15, use the figure.

14 Which transformation describes $DEFGH \rightarrow D'E'F'G'H''$?
   A 90° counterclockwise rotation
   B 90° clockwise rotation
   C reflection across the $y$-axis
   D translation

15 Which are the coordinates of $D'E'F'G'H''$?
   A $D'(-2, 0), E'(3, 2), F'(2, 4), G'(0, 4),$ and $H'(0, 0)$
   B $D'(2, 0), E'(3, 2), F'(2, 4), G'(0, 4),$ and $H'(0, 0)$
   C $D'(0, 2), E'(2, 3), F'(4, 2), G'(4, 0),$ and $H'(0, 0)$
   D $D'(0, -2), E'(2, -3), F'(4, -2), G'(4, 0),$ and $H'(0, 0)$

For Questions 16–18, use the figure.

16 Which translation will move $LMNOP$ so that the entire figure is in Quadrant I?
   A $(x, y) \rightarrow (x - 3, y - 3)$
   B $(x, y) \rightarrow (x - 3, y + 3)$
   C $(x, y) \rightarrow (x + 3, y + 3)$
   D $(x, y) \rightarrow (x + 3, y - 3)$

17 Suppose $LMNOP$ is reflected across the $x$-axis. In which quadrant will point $P'$ lie?
   A Quadrant I
   B Quadrant II
   C Quadrant III
   D Quadrant IV

18 If $LMNOP$ is rotated 180° about the origin, which will be the coordinates of $N''$?
   A $(-2, 1)$
   B $(-1, 2)$
   C $(-2, -1)$
   D $(-1, -2)$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.04** Solve problems involving geometric figures in the coordinate plane.

For Questions 1–3, use the figure.

1. Which coordinates are the vertices of HIJK?
   - A $H(3, 3), I(-4, 3), J(-4, -2), \text{ and } K(3, -2)$
   - B $H(-3, -3), I(-4, -3), J(-4, 2), \text{ and } K(-3, 2)$
   - C $H(3, -3), I(3, 4), J(-2, 4), \text{ and } K(-2, -3)$
   - D $H(-3, 3), I(4, 3), J(4, -2), \text{ and } K(-3, -2)$

2. Which of the following shows HIJK rotated 90° clockwise about the origin?
   - A
   - B
   - C
   - D

3. What is the perimeter of HIJK?
   - A 12 units
   - B 24 units
   - C 28 units
   - D 35 units

4. Rectangle ABCD has vertices $A(-2, 1), B(-2, 3), \text{ and } C(1, 3). \text{ In which quadrant is vertex } D \text{ located?}$
   - A Quadrant I
   - B Quadrant II
   - C Quadrant III
   - D Quadrant IV
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.04 (continued)

5 Rectangle $PQRS$ drawn on a coordinate grid has vertices $P(1, 8)$, $Q(3, 8)$, and $R(3, -2)$. What are the coordinates of $S$?
   A (1, $-2$)
   B (1, 3)
   C (3, 1)
   D (8, $-1$)

6 If quadrilateral $WXYZ$ is rotated $180^\circ$ about the origin, in which quadrant will point $Y'$ lie?
   A Quadrant I
   B Quadrant II
   C Quadrant III
   D Quadrant IV

7 Which transformation moves $\triangle RST$ to Quadrant III?
   A $(x, y) \rightarrow (x - 1, y - 5)$
   B $(x, y) \rightarrow (x + 1, y - 2)$
   C $(x, y) \rightarrow (x - 5, y - 1)$
   D $(x, y) \rightarrow (x - 5, y - 5)$

8 Which of the following describes the transformation of Figure 1 to Figure 3?
   A reflection across the $x$-axis and then across the $y$-axis
   B translation up 2 units and a $90^\circ$ clockwise rotation about the origin
   C translation up 5 units, then a reflection across the $y$-axis
   D translation up 5 units and a $90^\circ$ clockwise rotation about the origin
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 3.04 (continued)

For Questions 9 and 10, use the figure.

9 Amber would like the figure to appear upside-down. Which transformation should she use to move the figure?
A reflection across the x-axis
B reflection across the y-axis
C translation up 6 units
D 90° counterclockwise rotation

10 If Amber translates the figure 5 units left and 2 units up, in which quadrant(s) will it lie?
A Quadrant II only
B Quadrant III only
C Quadrant II and Quadrant III
D Quadrant III and Quadrant IV

For Questions 11 and 12, use the figure.

11 What is the area of \( \triangle STU \)?
A 14 square units
B 20 square units
C 28 square units
D 40 square units

12 Which transformation should you use if you want \( \overline{ST} \) to be horizontal?
A reflection across the x-axis
B translation 1 unit right and 4 units down
C 180° rotation
D 90° rotation about the origin
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 3.04** (continued)

For Questions 13 and 14, use the figure.

13 Mr. Simmons bought a real estate lot in Greensboro. The square on the grid represents the lot. If each unit represents 0.5 mile, what is the length of the lot?
   A 12 miles
   B 6 miles
   C 3 miles
   D 1.5 miles

14 What is the area of the lot?
   A 3 square miles
   B 9 square miles
   C 18 square miles
   D 36 square miles

For Questions 15 and 16, use the figure.

15 If Rodney reflects quadrilateral $ABCD$ over the $x$-axis, what geometric figure will the combined figures make?
   A pentagon
   B hexagon
   C octagon
   D decagon

16 Which transformation could Rodney have also used to make that same geometric figure as he made when he reflected quadrilateral $ABCD$ over the $x$-axis?
   A reflection across the $y$-axis
   B translation 2 units down
   C $180^\circ$ rotation about the origin
   D $90^\circ$ clockwise rotation about the origin
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.01 Develop fluency with counting strategies to determine the sample space for an event. Include lists, tree diagrams, frequency distribution tables, permutations, combinations, and the Fundamental Counting Principle.

1 The tree diagram shows the number of ways that Kimah can travel from her home in Mt. Airy to Atlanta, Georgia. She plans to travel from Mt. Airy to Greensboro by bus or car and then from Greensboro to Atlanta by bus, car, or airplane. In how many different ways can Kimah travel from her home to Atlanta?
   A 2   B 3       C 6   D 9

2 A photography studio offers a photo package of 5 different poses, 6 indoor shots, 5 outdoor shots, and 3 changes of clothing. Which expression uses the Fundamental Counting Principle to determine the number of different choices for each photograph in the package?
   A \(5 \times 6 \times 5 \times 3\)   B \(6 \times 5 \times 3\)       C \(5 + 6 + 5 + 3\)   D \(6 \times 5 \times 4 \times 3 \times 2 \times 1\)

3 On a holiday trip to the Outer Banks, Brandon can canoe, go horseback riding, golf, visit a lighthouse, hang glide, and collect seashells on Monday, Tuesday, Wednesday, and Thursday. In how many different ways can Brandon plan one different activity each day of his four days?
   A 6   B 10       C 24   D 360

4 Martina is packing for a weekend ski trip to Sapphire Valley. The tree diagram shows the different combinations of pants, sweaters, and shirts that she can wear. How many combinations of outfits are there?
   A 3   B 7       C 12   D 21

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Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.01 (continued)

The chart shows the menu for Bart’s Sandwich Shop. How many different sandwiches, consisting of one choice of each of meat, cheese, and bread, are available?

<table>
<thead>
<tr>
<th>Meats</th>
<th>Cheeses</th>
<th>Bread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ham</td>
<td>Cheddar, American, Havarti</td>
<td>White, Wheat, Pumpernickel, French, Italian, Asiago</td>
</tr>
<tr>
<td>Roast Beef</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salami</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pastrami</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A 3  B 16  C 48  D 144

An English teacher gave her students a choice of 4 out of 6 books to read for the semester. How many combinations of 4 books are there?

A 10  B 15  C 24  D 48

There are 5 soccer teams in a league. If each team plays the other team once, how many different games are played by the league in the season?

A 5  B 10  C 20  D 25

The student council at Glendale Middle School needs to choose 3 representatives out of 7 possible council members for an upcoming meeting between faculty and students. How many ways are there to choose a group of 3 representatives from the 7 council members?

A 35  B 21  C 10  D 6

How many permutations are there for the letters J, K, A, E, L, and M?

A 20  B 360  C 540  D 720
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 4.01** (continued)

10 A gym teacher challenged his students to climb a rope that hung from the ceiling of the gym. Five students lined up to take the challenge. In how many ways can the students line up?

A 5  
B 24  
C 60  
D 120

11 Mr. Halloway has 4 reference books that he keeps on a shelf behind his desk. In how many different ways can he arrange the books on the shelf?

A 4  
B 16  
C 24  
D 120

12 Kip has a 3-digit combination lock. He knows the 3 numbers are 4, 5, and 6, but he cannot remember their order. In how many different ways can the numbers be ordered?

A 3  
B 6  
C 9  
D 18

13 On a field trip to the zoo in Asheboro, 5 friends wanted to sit on the bus together, but there were only 3 adjacent seats. In how many ways could 3 of the 5 friends sit together?

A 6  
B 15  
C 60  
D 120

14 An art teacher has 9 examples of student artwork to hang on the wall, but there is space for only 7. In how many different ways can the teacher choose 7 artworks from 9?

A 16  
B 36  
C 49  
D 63
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 4.02** Use a sample space to determine the probability of an event.

Kevin tossed 3 fair coins. The tree diagram shows the possible outcomes of the toss. Use the diagram to answer Questions 1–5.

1 Which list shows the sample space for all 3 coins?
   A HT, HT, HT, HT
   B HHH, HHT, HTH, HTT, TTH, TTT
   C HHH, HHT, HTH, HTT, THH, THT, TTH, TTT
   D HTH, HTH, HTH, THT, THT, THT, HHH, TTT

2 Which list shows the number and the types of ways in which Kevin could get 2 tails and 1 head?
   A 1 way: HTH
   B 2 ways: HTH and THT
   C 3 ways: HTT, THT, and TTH
   D 4 ways: HTH, HTT, THT, and TTH

3 What is the probability that Kevin will get three heads when he tosses 3 fair coins?
   A \( \frac{1}{8} \)
   B \( \frac{1}{3} \)
   C \( \frac{3}{8} \)
   D \( \frac{2}{3} \)

4 If Kevin tosses the 3 coins 300 times, which is the most likely number of times he will get 2 heads and 1 tail?
   A 50
   B 75
   C 113
   D 240

5 Which is the best prediction for the number of times Kevin will get 3 tails if he tosses the coins 500 times?
   A 60
   B 120
   C 190
   D 330
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.02 (continued)

Use the following information to answer Questions 6–8.

Ione rolled two six-sided number cubes. The chart shows the sample space for all possible combinations of numbers that she could roll.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
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<td>1,3</td>
<td>1,4</td>
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</tr>
<tr>
<td>2,1</td>
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<td>2,3</td>
<td>2,4</td>
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<td>2,6</td>
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<tr>
<td>3,1</td>
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<td>3,3</td>
<td>3,4</td>
<td>3,5</td>
<td>3,6</td>
</tr>
<tr>
<td>4,1</td>
<td>4,2</td>
<td>4,3</td>
<td>4,4</td>
<td>4,5</td>
<td>4,6</td>
</tr>
<tr>
<td>5,1</td>
<td>5,2</td>
<td>5,3</td>
<td>5,4</td>
<td>5,5</td>
<td>5,6</td>
</tr>
<tr>
<td>6,1</td>
<td>6,2</td>
<td>6,3</td>
<td>6,4</td>
<td>6,5</td>
<td>6,6</td>
</tr>
</tbody>
</table>

6 What is the probability that Ione will roll two numbers that add up to 10?

A $\frac{1}{4}$  
B $\frac{1}{6}$  
C $\frac{1}{12}$  
D $\frac{1}{36}$

7 If Ione rolls the number cubes 300 times, what is the most likely number of times she will roll a number that adds up to 10?

A 10  
B 25  
C 50  
D 75

8 To win a game, Ione needs to roll a sum of 8 or greater. What is the probability that she will roll the sum she needs on the next roll?

A $\frac{5}{36}$  
B $\frac{1}{12}$  
C $\frac{1}{6}$  
D $\frac{5}{12}$

Use the following information to answer Questions 9 and 10.

A spinner has 3 equal sectors of yellow, blue, and green. Another spinner has 4 equal sectors of yellow, blue, green, and red.

9 What is the sample space for spinning a combination of at least 1 blue color?

A by, bg, br  
B bb, by, bg, br  
C yb, by, bg, br, gb  
D yb, by, bb, bg, br, gb

10 If you spin both spinners, what is the probability of getting a combination of 2 colors that are the same?

A $\frac{1}{4}$  
B $\frac{1}{3}$  
C $\frac{1}{2}$  
D $\frac{3}{4}$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Objective 4.02 (continued)

Use the following information to answer Questions 11–14.

A box contains 2 A tiles, 1 R tile, and 1 E tile. The tree diagram represents the outcomes when drawing two tiles at random. When a tile is drawn from the box, its letter is recorded, and it is then placed back into the box. Then another tile is drawn.

11 What is the sample space for drawing a two-tile combination of one A tile and one E tile?
   A AE
   B AE, AE
   C AE, AE, EA
   D AE, AE, EA, EA

12 What is the probability that both of the tiles drawn will be the same letter?
   A \( \frac{1}{8} \)
   B \( \frac{3}{8} \)
   C \( \frac{5}{8} \)
   D \( \frac{3}{4} \)

13 If two letter tiles are drawn 500 times, what is the most likely number of times that both of the tiles drawn will be the same letter?
   A 65
   B 185
   C 275
   D 375

14 If two letter tiles are drawn 500 times, what is the most likely number of times at least one of the tiles drawn will be an R?
   A 30
   B 125
   C 160
   D 220
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.02 (continued)

Use the following information to answer Questions 15–18.
A number cube is numbered 1 to 6. A spinner has 5 equal sectors of blue, gold, red, silver, and tan. The sample space represents the outcome of rolling the number cube and then spinning the spinner.

15 If you roll a number cube and spin the spinner, what is the probability that that the color will be gold?

A \( \frac{1}{5} \)  
B \( \frac{1}{6} \)  
C \( \frac{1}{11} \)  
D \( \frac{1}{30} \)

16 What is the probability that the number will be 5?

A \( \frac{1}{5} \)  
B \( \frac{1}{6} \)  
C \( \frac{1}{11} \)  
D \( \frac{1}{30} \)

17 What is the probability that the number will be 3 and the color will be red?

A \( \frac{1}{6} \)  
B \( \frac{1}{3} \)  
C \( \frac{1}{30} \)  
D \( \frac{6}{15} \)

18 How many times will you most likely spin a red if you spin the spinner 150 times?

A 30  
B 25  
C 6  
D \( \frac{1}{5} \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.03 Conduct experiments involving simple and compound events.

Use this information to answer Questions 1–5.

Erika has a jar of plastic paper clips that she keeps on her desk. There are 10 green, 8 yellow, 11 blue, 4 orange, 2 purple, and 5 pink paper clips in the jar.

1 If Erika selects a paper clip from the jar at random, which color will she most likely select?
   A green  B yellow  C pink  D blue

2 If Erika reaches into the jar without looking and grabs a paper clip, what is the probability that the paperclip is orange?
   A \( \frac{1}{8} \)  B \( \frac{1}{9} \)  C \( \frac{1}{10} \)  D \( \frac{1}{40} \)

3 If Erika keeps the orange paper clip and then grabs another one from the jar, what is the probability that it is orange?
   A \( \frac{4}{39} \)  B \( \frac{1}{13} \)  C \( \frac{1}{12} \)  D \( \frac{1}{10} \)

4 Suppose Erica selects a paper clip without looking, puts it back in the jar, and then selects another one. What is the probability that the first paper clip is green and the second is pink?
   A \( \frac{1}{32} \)  B \( \frac{1}{12} \)  C \( \frac{3}{8} \)  D \( \frac{5}{8} \)

5 Suppose Erica selects a paper clip without looking, keeps it, and then selects another one. Which expression represents the probability that the first paper clip is yellow and the second is purple?
   A \( \frac{1}{8} \cdot \frac{1}{2} \)  B \( \frac{8}{40} \cdot \frac{2}{8} \)  C \( \frac{8}{40} \cdot \frac{2}{40} \)  D \( \frac{8}{40} \cdot \frac{2}{39} \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.03 (continued)

A box contains 12 letter tiles. There are 4 B tiles, 6 S tiles, and 2 U tiles. Use this information for Questions 6–8.

6 If Nathan chooses a tile at random, what is the probability that the tile is not a B?
   A \( \frac{1}{6} \)  
   B \( \frac{1}{3} \)  
   C \( \frac{1}{2} \)  
   D \( \frac{2}{3} \)

7 Suppose that Nathan chooses a tile at random and the tile is a B. Nathan keeps the tile and does not put it back in the box. If Nathan chooses another tile, what is the probability that will be another B?
   A \( \frac{1}{4} \)  
   B \( \frac{3}{11} \)  
   C \( \frac{1}{3} \)  
   D \( \frac{8}{11} \)

8 What is the probability that Nathan chooses an S tile at random, puts it back into the box, and then chooses a U tile at random?
   A \( \frac{2}{3} \)  
   B \( \frac{1}{6} \)  
   C \( \frac{1}{12} \)  
   D \( \frac{1}{36} \)

9 What is the probability of getting one head and one tail if you toss two fair coins, a nickel and a dime, at the same time?
   A \( \frac{1}{4} \)  
   B \( \frac{1}{2} \)  
   C \( \frac{3}{4} \)  
   D \( 1 \)

10 There are 12 boys and 16 girls in a science class. If the teacher chooses a student at random to help pass out test tubes, what is the probability that the teacher chooses a girl?
   A \( \frac{3}{4} \)  
   B \( \frac{4}{7} \)  
   C \( \frac{3}{7} \)  
   D \( \frac{4}{11} \)
For Questions 11–13, suppose you toss a coin and roll a 6-sided number cube.

11 What is the probability that you toss a head and roll a 3?
- A $\frac{1}{12}$
- B $\frac{1}{6}$
- C $\frac{1}{3}$
- D $\frac{1}{2}$

12 What is the probability that you toss a head or a tail?
- A 0
- B $\frac{1}{4}$
- C $\frac{1}{2}$
- D 1

13 What is the probability that you either toss a tail or roll a 7?
- A $\frac{1}{12}$
- B $\frac{1}{6}$
- C $\frac{1}{2}$
- D 1

For Questions 14–16, use the spinner shown in the figure.

14 What is the probability that the spinner lands on red or purple?
- A $\frac{2}{5}$
- B $\frac{3}{8}$
- C $\frac{5}{16}$
- D $\frac{1}{4}$

15 What is the probability that the spinner lands on yellow or blue?
- A $\frac{2}{5}$
- B $\frac{3}{8}$
- C $\frac{5}{16}$
- D $\frac{1}{4}$

16 What is the probability that the spinner lands on a section that is not orange?
- A 1
- B $\frac{3}{8}$
- C $\frac{5}{16}$
- D $\frac{1}{6}$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.03 (continued)

For Questions 17–21, suppose you have a bag containing 4 blue marbles, 6 red marbles, and 2 white marbles.

17 If 2 marbles are picked from the bag, one after the other without putting the first one back, what is the probability that they are both red?

A \( \frac{5}{22} \)  
B \( \frac{1}{4} \)  
C \( \frac{5}{11} \)  
D \( \frac{1}{2} \)

18 If 1 marble is picked from the bag, looked at, then replaced, and a marble is picked again, what is the probability that they are both red?

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

19 If 1 marble is picked from the bag, what is the probability that it is red or blue?

A \( \frac{1}{3} \)  
B \( \frac{1}{2} \)  
C \( \frac{2}{3} \)  
D \( \frac{5}{6} \)

20 If 1 marble is picked from the bag, what is the probability that it is blue or white?

A \( \frac{1}{3} \)  
B \( \frac{1}{2} \)  
C \( \frac{2}{3} \)  
D \( \frac{5}{6} \)

21 If 1 marble is picked from the bag, what is the probability that it is not white?

A \( \frac{1}{6} \)  
B \( \frac{1}{3} \)  
C \( \frac{1}{2} \)  
D \( \frac{5}{6} \)
Standards Practice

**Objective 4.04** Determine and compare experimental and theoretical probabilities for simple and compound events.

1. Luis has a bag that contains 2 blue marbles and 2 yellow marbles. After 10 trials with replacement, Luis has pulled 3 blue marbles and 7 yellow marbles from the bag. Assuming all of the marbles are without defects and each is the same size, which of the following best explains these results?  
   A. The number of trials is low.  
   B. Luis recorded the results of the trials incorrectly.  
   C. Some of the marbles stuck to the fabric of the bag.  
   D. Luis did not reach into the bag far enough.

2. Suppose Luis conducted another experiment with his bag of marbles. If he pulled marbles from the bag 3 times and each time the marble was blue, what is the probability that the fourth time, he also pulled out a blue marble?  
   A. \( \frac{1}{4} \)  
   B. \( \frac{1}{3} \)  
   C. \( \frac{1}{2} \)  
   D. 1

3. A group of 4 friends is playing a game that uses the spinner shown. After spinning the spinner 6 times, it came up gold 3 times. They know the theoretical possibility of spinning gold is \( \frac{1}{4} \). What can they do to determine if the spinner is fair?  
   A. The 4 friends should ask 4 other people to spin the spinner 6 times and compare the results to \( \frac{1}{4} \).  
   B. They should spin the spinner 6 more times to see if another color comes up 3 times.  
   C. Each of the 4 friends should spin the spinner 10 times and compare each of the results to \( \frac{1}{4} \).  
   D. Each of the 4 friends should spin the spinner at least 20 times, combine their results, and then compare the results to \( \frac{1}{4} \).
OBJECTIVE 4.04 (continued)

4 To determine whether a quarter is a fair coin, Yesenia tossed the quarter 88 times. She tossed heads 42 times and tails 46 times. Which statement best describes what Yesenia should conclude from her experiment?

A The number of trials is sufficient and the experimental and theoretical probabilities are close, so the quarter is fair.

B The number of trials is not sufficient, so she cannot determine whether the quarter is fair.

C Since the experimental probability is not exactly the same as the theoretical probability, the quarter is not fair.

D Since the experimental probability and theoretical probability are close, she should toss the quarter 12 more times. If the experimental probability is the same after 12 tosses, the quarter is fair.

Use the following information for Questions 5 and 6.

A class is conducting a probability experiment using the spinner shown. The table shows the results of spinning the spinner 200 times.

<table>
<thead>
<tr>
<th>Spinner Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue 76</td>
</tr>
<tr>
<td>Red 27</td>
</tr>
<tr>
<td>Yellow 52</td>
</tr>
<tr>
<td>Green 45</td>
</tr>
</tbody>
</table>

5 Which statement best describes the comparison of experimental and theoretical probabilities for the spinner?

A The experimental and theoretical probabilities are close.

B The experimental and theoretical probabilities for blue and yellow are close, but for red and green are not.

C The experimental and theoretical probabilities for red and green are close, but for blue and yellow are not.

D None of the probabilities are close.

6 What is the theoretical probability that the spinner lands on blue on the next spin?

A \( \frac{3}{4} \)

B \( \frac{3}{8} \)

C \( \frac{1}{4} \)

D \( \frac{1}{8} \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.04 (continued)

Use the following information to answer Questions 7–10.

Maurice surveyed all the students in the 6th grade who have 2 siblings. He asked them how many boys and how many girls there are in their family. The results are shown in the table.

<table>
<thead>
<tr>
<th>Combinations of Boys and Girls</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 girls</td>
<td>6</td>
</tr>
<tr>
<td>2 girls, 1 boy</td>
<td>9</td>
</tr>
<tr>
<td>1 girl, 2 boys</td>
<td>10</td>
</tr>
<tr>
<td>3 boys</td>
<td>5</td>
</tr>
</tbody>
</table>

7 In this sample group, what is the probability that the family contains 2 girls and 1 boy?
   A \( \frac{1}{3} \)  
   B \( \frac{3}{10} \)  
   C \( \frac{1}{5} \)  
   D \( \frac{1}{6} \)  

8 In this sample group, what is the probability that a family with 3 children contains 3 boys?
   A \( \frac{1}{3} \)  
   B \( \frac{3}{10} \)  
   C \( \frac{1}{5} \)  
   D \( \frac{1}{6} \)  

9 What is the theoretical probability that a family with 3 children contains 3 boys?
   A \( \frac{1}{8} \)  
   B \( \frac{1}{4} \)  
   C \( \frac{3}{8} \)  
   D \( \frac{1}{2} \)  

10 Which statement comparing experimental and theoretical probabilities is true?
   A The experimental probability of a family with 3 boys may be less than the theoretical probability of a family with 3 boys.  
   B The experimental probability of a family with 3 boys will always be equal to the theoretical probability of a family with 3 boys.  
   C The experimental probability of a family with 3 boys will always be greater than the theoretical probability of a family with 3 boys.  
   D The experimental probability of a family with 3 boys will always be different from that of a family with 3 girls.
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.04 (continued)

Use the following information to Questions 11–15.
A number tetrahedron is thrown and a coin is tossed, each 6 times. The results were (1, H), (3, H), (4, T), (4, H), (2, T), and (4, T).

11 What is the experimental probability that the coin was a head and the tetrahedron a 4?
A \( \frac{1}{8} \) B \( \frac{1}{6} \)
C \( \frac{1}{3} \) D \( \frac{1}{2} \)

12 What is the experimental probability that the coin was a tail or the tetrahedron was a 2?
A \( \frac{1}{8} \) B \( \frac{1}{6} \)
C \( \frac{1}{3} \) D \( \frac{1}{2} \)

13 What is the theoretical probability that the coin would be a head and the tetrahedron would show a 4?
A \( \frac{1}{8} \) B \( \frac{1}{6} \)
C \( \frac{1}{3} \) D \( \frac{1}{2} \)

14 What is the theoretical probability that the coin would be a tail or the tetrahedron would show a 2?
A \( \frac{1}{8} \) B \( \frac{1}{3} \)
C \( \frac{1}{2} \) D \( \frac{5}{8} \)

15 Which statement comparing experimental and theoretical probabilities is true?
A The experimental probability of a tail must be different from the theoretical probability of a tail.
B The experimental probability of a tail must approximate the theoretical probability of a tail for a large number of trials with a fair coin.
C The experimental probability different from the theoretical probability suggests an unfair coin or tetrahedron.
D The experimental probability of a number roll cannot be greater than the theoretical probability.

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Standards Practice

Read each question and choose the best answer. Then write the letter for
the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.05 Determine and compare experimental and
theoretical probabilities for independent and dependent events.

A bag contains 3 yellow, 2 brown, 5 green, 4 blue, and 2 red chips. Use this information to answer Questions 1–3.

1 Rami draws a chip from the bag without looking. He keeps the chip and then draws another one from the bag. What is the probability that both chips are blue?

A \( \frac{1}{16} \)  
B \( \frac{1}{20} \)  
C \( \frac{9}{20} \)  
D \( \frac{1}{2} \)

2 Suppose Rami draws one chip and then another from the bag. He does not look in the bag and he does not replace the first chip. What is the probability that the first chip is brown and the second is red?

A \( \frac{1}{120} \)  
B \( \frac{1}{64} \)  
C \( \frac{1}{60} \)  
D \( \frac{1}{4} \)

3 Suppose Rami draws 2 chips as in Question 2, but he replaces the brown chip before drawing the red chip. Which statement describes how the probability of the situation changes from that in Question 2?

A The events in both situations are independent, so the probability of the situation does not change.
B Since you multiply probabilities in the first situation and add them in the second, the probability of the second situation is less than the probability of the first.
C Since Rami puts the brown chip back in the bag in the second situation, the probability of drawing a red chip becomes greater, which makes the probability of the second situation greater than the probability of the first.
D Since Rami puts the brown chip back in the bag in the second situation, the probability of drawing a red chip becomes lesser, which makes the probability of the second situation lesser than the probability of the first.
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 4.05** (continued)

For Questions 4–7, a bag contains 6 pink, 8 white, 4 green, and 2 blue ribbons. Jasmine picks ribbons out of the bag at random.

4 Jasmine picked one ribbon out of the bag, put it aside, and then picked out a second ribbon. What is the probability that both are white?

- A \( \frac{7}{50} \)
- B \( \frac{14}{95} \)
- C \( \frac{4}{25} \)
- D \( \frac{2}{5} \)

5 Jasmine picked one ribbon out of the bag, looked at it, put it back, and then picked a ribbon again. What is the probability that both are white?

- A \( \frac{7}{50} \)
- B \( \frac{14}{95} \)
- C \( \frac{4}{25} \)
- D \( \frac{2}{5} \)

6 Jasmine picked one ribbon out of the bag, put it aside, and then picked out a second ribbon. What is the probability that the first is white and the second is blue?

- A \( \frac{1}{25} \)
- B \( \frac{4}{95} \)
- C \( \frac{4}{25} \)
- D \( \frac{1}{4} \)

7 Which statement is true?

- A When the first white ribbon is replaced before the second is chosen, the probability that the second is white is less than when the first ribbon is not replaced.
- B When the first white ribbon is replaced before the second is chosen, the probability that the second is white is greater than when the first white ribbon is not replaced.
- C When the first white ribbon is replaced before the second is chosen, the probability that the second is white is the same as when the first white ribbon is not replaced.
- D When the first ribbon is replaced before the second is chosen, the probability that the second is white is dependent on whether the first was white.

8 What is the probability of picking 2 pink ribbons out of the bag if the first is not replaced before the second is chosen?

- A \( \frac{3}{10} \)
- B \( \frac{1}{4} \)
- C \( \frac{9}{100} \)
- D \( \frac{3}{38} \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.05 (continued)

For Questions 9–13, a sock drawer contains 6 black, 13 white, 4 striped, and 2 polka dot socks. Socks are pulled out at random.

9 If 1 sock is pulled out of the drawer and replaced before a sock is pulled out again, what is the probability that both socks are polka dot?
   A $\frac{2}{25}$       B $\frac{1}{150}$       C $\frac{4}{625}$       D $\frac{1}{300}$

10 If 1 sock is pulled out of the drawer, set aside, and a second sock pulled out, what is the probability that both socks are polka dot?
   A $\frac{2}{25}$       B $\frac{1}{150}$       C $\frac{4}{625}$       D $\frac{1}{300}$

11 When 1 sock is pulled out, replaced, and a sock is pulled out again, which is true about the events?
   A They are independent.
   B They are dependent.
   C They are the same.
   D Their probabilities are different.

12 Which statement is true?
   A When the first sock is replaced before the second one is chosen, the probability that the second is white is $\frac{1}{4}$.
   B When the first sock is not replaced before the second one is chosen, the probability that the second is white is $\frac{13}{25}$.
   C When the first sock is not replaced before the second one is chosen, the probability that the second is white is $\frac{12}{25}$.
   D When the first sock is replaced before the second one is chosen, the probability that the second is white is $\frac{13}{25}$.

13 Two socks are picked from the drawer. What is the probability that the first sock is white and the second is black if the first sock is not replaced before the second is chosen?
   A $\frac{78}{625}$       B $\frac{13}{100}$       C $\frac{19}{50}$       D $\frac{19}{49}$
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 4.05 (continued)**

*For Questions 14–17, Susie and Yang are playing a matching game. They have square tiles, each containing a picture, all facedown. The tiles left are: 4 Biltmore Estate, 3 Tweetsie Railroad, 2 Battleship North Carolina, 4 Elizabethan Gardens, and 2 Maritime Museum.*

14 If Susie chooses 2 tiles without replacing the first before she draws the second, what is the probability that the first is Biltmore Estate and the second is Tweetsie Railroad?

- A $\frac{7}{29}$
- B $\frac{7}{30}$
- C $\frac{2}{35}$
- D $\frac{4}{75}$

15 If Susie chooses 2 tiles but replaces the first after looking at it before she draws the second, what is the probability that the first is Biltmore Estate and the second is Tweetsie Railroad?

- A $\frac{7}{29}$
- B $\frac{7}{30}$
- C $\frac{2}{35}$
- D $\frac{4}{75}$

16 Which probability will be greatest?

- A The probability of getting a Biltmore Estate first, then a Tweetsie Railroad, when the first tile is replaced before the second is drawn.
- B The probability of getting a Biltmore Estate first, then a Tweetsie Railroad, when the first tile is not replaced before the second is drawn.
- C The probability of getting a Maritime Museum first, then another Maritime Museum, when the first tile is not replaced before the second is drawn.
- D The probability of getting a Maritime Museum first, then another Maritime Museum, when the first tile is replaced before the second is drawn.

17 If Yang chooses a Battleship North Carolina and does not replace it, what is the probability that Susie then picks a Maritime Museum?

- A $\frac{1}{7}$
- B $\frac{1}{35}$
- C $\frac{1}{10}$
- D $\frac{3}{29}$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.06 Design and conduct experiments or surveys to solve problems; report and analyze results

1. A juice company has decided to advertise its product by placing a music CD in each of their packaged juices. There are four different music CDs and the probability of each CD being in a package is equally likely. You want all four CDs. Which statement is true?
   A. You will need to buy 4 packages since the probability of getting one CD is \( \frac{1}{4} \).
   B. Once you have 3 of the CDs, the probability of getting the fourth one in your next package is \( \frac{1}{4} \).
   C. You will need to buy 16 packages since the probability of getting all 4 CDs is \( \frac{1}{16} \).
   D. You have no chance of getting all 4 CDs in the first 4 packages you choose at random.

2. Students in a geography class at a middle school polled 50 students at their school to determine which location they would prefer for a vacation. The experimental results of the poll are shown in Table 1.

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Hatteras</td>
<td>15</td>
</tr>
<tr>
<td>Wilmington</td>
<td>6</td>
</tr>
<tr>
<td>Mount Mitchell</td>
<td>18</td>
</tr>
<tr>
<td>Kill Devil Hills</td>
<td>4</td>
</tr>
<tr>
<td>Ocracoke Island</td>
<td>7</td>
</tr>
</tbody>
</table>

The students in the geography class later polled another 200 students. Table 2 shows the results of the poll. If the experimental results of the second poll had been more like those of the first poll, how many more students would have preferred a vacation at Mount Mitchell?

A. 11 students  
B. 15 students  
C. 43 students  
D. 54 students
3 The glee club at a middle school polled 60 students from the sixth, seventh, and eighth grades to find out how many planned to attend the first away football game of the year. The table shows the results of the poll. The actual number of students who attended the game was 166. Based on the poll, which is the most likely number of students from the sixth grade who attended the game?

A 42
B 50
C 78
D 98

4 The table shows sample data Manuel gathered from spinning a spinner. Which spinner most likely produced the data?

A

B

C

D

5 Northwoods Middle School is selling school sweatshirts to raise funds to buy a new sound system. The table shows the number of orders after two days. The school predicts it will sell 150 sweatshirts. Based on the data in the table, how many orders will be placed for large sweatshirts?

A 30
B 68
C 90
D 102
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.06 (continued)

6 A software company in Research Triangle Park created a computer game that helps middle school students develop their logic skills. In which sample population should the company test the game to see if it appeals to middle school students?
   A middle schools in each of the geographic regions of North Carolina
   B middle schools in three or four major metropolitan areas in the states
   C middle schools in each region of the states, including the Northeast, the Northwest, the Southwest, the Southeast, and the Midwest
   D middle schools in two coastal states, the Midwest, and either Alaska or Hawaii

7 Meghan is the captain of the swim team at her school. She is thinking about starting a recreational swim club for students. She decides to ask students on the swim team if they would be interested in joining the club. Which statement best describes the sample Meghan uses in her survey?
   A The sample is unbiased because she surveys students who are interested in swimming.
   B The sample is biased because it is limited to members of the swim team.
   C The sample size is unknown, so it is not possible to tell if the sample is biased or unbiased.
   D The sample is biased because she asks only one question.

8 Julian wants to find out what issues most concern the students at his school. He plans to randomly choose 100 students to interview during different times of the day, over a period of three weeks. Which of the following questions would most likely result in an unbiased survey?
   A Are you more concerned about grades or friendship?
   B What is one of the issues you discussed with your parents this week?
   C What is the major issue facing sixth grade students today?
   D What are the two issues you discuss most with your friends?
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 4.06 (continued)

9 A community librarian was given funds to purchase new books for the library. She randomly chose 150 patrons between the hours of 10:00 A.M. and 2:00 P.M. and recorded the type of books they borrowed on that visit. The survey results showed that most patrons borrowed mystery novels or children’s books. The librarian recommended that the library buy these types of books. Which statement best describes the conclusion of the librarian?
   A The sample is large and random, so her conclusion is valid.
   B The sample is not large enough, so her conclusion is not valid.
   C Her conclusion is not valid because the sample excludes people who work and attend school during the survey hours.
   D Her conclusion is invalid because we do not know if she recommended more mysteries or more children’s books.

10 The owner of a movie theater in Durham wants to boost attendance at the theater. He is thinking about offering a club membership to teens. Club members would get a discount on movie tickets if they saw at least one movie each month. Which of the following methods would be most appropriate for a survey designed to find out if teens would be interested in this idea?
   A Mail a survey to 300 residents in Durham.
   B Hand out surveys to each person who buys a ticket.
   C Leave surveys in the administration office at middle schools and high schools in Durham.
   D Use the telephone directory to randomly call until he reaches 200 households with teens in Durham.

11 To find out whether people recycle in their community, students randomly surveyed 300 out of 850 households in the community. The results showed that 120 households do not recycle, 50 recycle paper and plastic, and the rest recycle most items, including paper, plastic, glass, and aluminum. Which can the students conclude?
   A More than half of the households in the community recycle.
   B Less than half of the households in the community recycle.
   C They need to survey a larger sample to make a conclusion.
   D They need more categories to determine the extent of recycling.
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 5.01** Simplify algebraic expressions and verify the results using the basic properties of rational numbers: Identity, Commutative, Associative, Distributive, Order of operations.

1. The last steps in simplifying an algebraic expression are shown below. Which property allows you to justify the solution $4y$?

   $$(2x - 2x) + 4y$$
   $$= 0 + 4y$$
   $$= 4y$$

   A. Associative Property of Addition
   B. Commutative Property of Addition
   C. Distributive Property
   D. Additive Identity

   1 __________

2. Which of the following shows the Multiplicative Identity Property?

   A. $9x(1) = 9x$
   B. $9x + 0 = 9x$
   C. $9x = (8 + 1)x$
   D. $9x = x(9)$

   2 __________

3. Which property can be used to rewrite $7x + (4 + 3x)$ as $7x + (3x + 4)$?

   A. Associative Property of Addition
   B. Associative Property of Multiplication
   C. Commutative Property of Addition
   D. Commutative Property of Multiplication

   3 __________

4. If you use the order of operations to simplify $2x \cdot 8 ÷ 4x + 9$, what is the result?

   A. $4x^2 + 9$
   B. $4x + 9$
   C. 10
   D. 13

   4 __________

5. Which expression is the result of simplifying $6x + 7 \cdot 3x - 2 + 54x ÷ 3^3$ using the order of operations?

   A. $9x - 2$
   B. $27x - 4$
   C. $29x - 2$
   D. $45x - 2$

   5 __________
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.01 (continued)

6 Which property do you use to rewrite \(4(2x)\) as \((4 \times 2)x\)?
   A  Associative Property of Multiplication
   B  Commutative Property of Multiplication
   C  Distributive Property
   D  Multiplicative Identity Property

7 Wesley rewrites the expression \(5x + (2x + 2)\) using the Associative Property of Addition. Which expression did he write?
   A  \(x(5 + 2) + 2\)
   B  \(2x + 2 + 5x\)
   C  \((5x + 2x) + 2\)
   D  \(2x + 5x + 2\)

8 Alejandro uses the Associative Property of Multiplication to rewrite \(3m(2m \times n)\). Which expression does he write?
   A  \((3m + 2m)n\)
   B  \((3m \times 2m)n\)
   C  \(6m \times 3mn\)
   D  \(3m \times 2m \times n\)

9 Which expression do you obtain if you use the Commutative Property of Multiplication to rewrite \((5a + b)a\)?
   A  \(a(5a + b)\)
   B  \(5a(a + b)\)
   C  \((5a + b) \times a\)
   D  \(5a + (ba)\)

10 Hailey wants to simplify the expression \(5(b + 2) + 6(3b + 1)\). First she rewrites the expression using the Distributive Property. Which expression does she write?
   A  \((5b + 7) + (18b + 7)\)
   B  \((5b) + (10) + (3b) + 1\)
   C  \(11(b + 2) + (3b + 1)\)
   D  \((5 \times b) + (5 \times 2) + (6 \times 3b) + (6 \times 1)\)
OBJECTIVE 5.01 (continued)

11 Francisco wants to simplify \( \frac{h}{7(3k + 3h)} \). The first step he uses to simplify the expression is to rewrite \( \frac{h}{7(k + 3h)} \) as \( \frac{h}{7k + 21h} \). Which property justifies the step?
A Associative Property of Multiplication
B Commutative Property of Multiplication
C Distributive Property
D Multiplicative Identity Property

12 Which is an equivalent expression for \( 20y + 4x \) using the Distributive Property?
A \( 5(4y) + 4x \)
B \( 4(5y + x) \)
C \( (20 + 4)(y + x) \)
D \( 4x + 20y \)

13 Which is \( x(x + 2) + x(4x) + 4 \) simplified?
A \( x^2 + 2x + 4 + 4 \)
B \( x^2 + 2x + 4x^2 + 4 \)
C \( x^2 + 6x + 4 \)
D \( 5x^2 + 2x + 4 \)

14 Camille simplified \( 7(4x + 5y) \) on a test. Which expression did she write for an answer?
A \( (7 \times 4) + (7 \times 5) + (x \times y) \)
B \( 28x + 35y \)
C \( 63xy \)
D \( 11x + 12y \)

15 Jamal’s teacher asked him to simplify the expression \( 2x(3x + y) + 5x(x + 2y) \) for the class. Which expression did he obtain?
A \( 28x^2 + 21xy \)
B \( 6x^2 + 5x + 10xy \)
C \( 11x^2 + 12xy \)
D \( 11x + 12y \)
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.02 Use and evaluate algebraic expressions.

1 Xavier wants to buy 4 T-shirts and 2 pairs of shorts for a vacation to Emerald Isle. Which expression represents the amount of money he needs if $t$ is the cost of one T-shirt and $s$ is the cost of one pair of shorts?
   - A $t + s$
   - B $4t + 2s$
   - C $4(t + 2s)$
   - D $(4 + 2) \times (t + s)$

2 What is the total cost of 4 T-shirts that cost $12 each and 2 pairs of shorts that cost $18 each?
   - A $30$
   - B $36$
   - C $84$
   - D $180$

Use the following information for Questions 3 and 4.

A dive shop in Morehead City offers shipwreck dives for $95 per person plus $15 per hour for equipment.

3 Which expression represents the cost for $h$ hours of diving for one person?
   - A $15h + 95$
   - B $15(h + 95)$
   - C $h(15 + 95)$
   - D $95(h + 15)$

4 What is the cost to Sydney if she signs up for the shipwreck dive and rents the equipment for 2.5 hours?
   - A $110$
   - B $112.50$
   - C $132.50$
   - D $252.50$

5 Hudson earns money by walking dogs for neighbors who are at work or on vacation. He also washes and combs dogs. He charges $15 to wash and comb a dog and $5 per hour to walk a dog. Which expression represents the amount Hudson earns if he walks dogs for $h$ hours and washes $w$ dogs?
   - A $(15 + 5) \times (w + h)$
   - B $(15 + w) \times (5 + h)$
   - C $15w + 5h$
   - D $15w \times 5h$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.02 (continued)

6 Evaluate $180 - 12d$ if $d = 5$.
   A 120  B 160  C 200  D 240

7 Evaluate $14x ÷ 10y$ if $x = 10$ and $y = 0.25$.
   A 140  B 115  C 70  D 56

For Questions 8 and 9, Cheryl is playing basketball.

8 If Cheryl makes $x$ 2-point baskets, $y$ 3-point baskets, and $z$ 1-point free throws, which expression gives the total number of points she scores?
   A $6xyz$  B $(2x)(3y) + 1z$  C $2x + 3y + z$  D $x + 2 + y + 3 + z + 1$

9 If $x = 5$, $y = 3$, and $z = 6$, how many points did Cheryl score?
   A 14  B 22  C 25  D 31

For Questions 10 and 11, Liu is driving from Pinehurst to Pembroke at 50 miles per hour.

10 If Liu drives for $x$ hours, which expression gives the number of miles he will travel?
   A $\frac{50}{x}$  B $50x$  C $\frac{x}{50}$  D $50 + x$

11 How many miles will Liu drive if he travels for $2\frac{1}{2}$ hours?
   A 100.5 miles  B 125 miles  C 140 miles  D 175 miles
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.02 (continued)

For Questions 12 and 13, Molly wants to buy 3 outfits for her doll. She has $20 to spend.

12 If each outfit costs \(x\) dollars, which expression represents the money Molly will have left after she buys the 3 outfits?
   A  \(20 - x - 3\)
   B  \(17x\)
   C  \(3x - 20\)
   D  \(20 - 3x\)

13 If \(x = 6\), how much money will Molly have left?
   A  $2
   B  $4
   C  $8
   D  $18

For Questions 14 and 15, the Lee family paid off the cost of a cruise they took. They made an initial payment of $200, and then they paid $300 per month for \(y\) months.

14 Which expression gives the total amount the Lee family paid for their cruise?
   A  \(200 + 300y\)
   B  \(300 + 200y\)
   C  \(500y\)
   D  \(500 + y\)

15 If the Lee family made 12 equal monthly payments, how much did their cruise cost?
   A  $512
   B  $2,700
   C  $3,800
   D  $6,000

16 What is the value of \(6 + 2a - b\) if \(a = 4\) and \(b = 3\)?
   A  11
   B  8
   C  9
   D  7
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.03 Solve simple (one- and two-step) equations or inequalities.

Use the following information for Questions 1 and 2.

Vaugh has been riding his bicycle on a beginner’s trail in the Pisgah National Forest. The trail is 9.1 miles long and he has stopped for a rest after 2.5 miles.

1 Which equation can be used to determine how many more miles $m$ Vaugh has left to ride?
   A $m - 2.5 = 9.1$
   B $m = 9.1 - 2.5$
   C $m ÷ 2.5 = 9.1$
   D $2.5m = 9.1$

2 How many more miles does Vaugh have left to ride?
   A 22.75 miles
   B 11.6 miles
   C 6.6 miles
   D 3.64 miles

Use the following information for Questions 4 and 5.

A group of boys were going on a llama trek. They made a combined $20 down payment and then they each paid $31 each. The total cost of the adventure was $175.

4 Which equation could be used to find the number of boys $x$ who went on the llama trek?
   A $31x + 20 = 175$
   B $51x = 175$
   C $20x + 31 = 175$
   D $x + 51 = 175$

5 How many boys went on the llama trek?
   A 15
   B 9
   C 7
   D 5
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.03 (continued)

Use the following information for Questions 6 and 7.
A researcher measured the average speed of a loggerhead turtle swimming near Topsail Island at 20 miles per hour. The loggerhead turtle has to swim 28 miles to its nesting destination.

6 Which equation can be used to determine how many hours $h$ it will take the turtle to reach its nesting spot?
- A $h - 20 = 28$
- B $h + 20 = 28$
- C $20h = 28$
- D $28h = 20$

7 How long will it take the loggerhead turtle to reach its destination?
- A about 0.7 hour
- B 1.4 hours
- C 8 hours
- D 48 hours

Use the following information for Questions 8 and 9.
The weight of any object on the moon is about one-sixth its weight on Earth.

8 Which equation can you use to determine the weight $w$ of Anyi’s dog on Earth, if his weight on the moon is 12 pounds?
- A $\frac{w}{6} = 12$
- B $\frac{6}{w} = 12$
- C $w - 6 = 12$
- D $w + 6 = 12$

9 What is the weight of Anyi’s dog on Earth?
- A 2 pounds
- B 6 pounds
- C 18 pounds
- D 72 pounds

10 The lake at which Maggie is fishing has a 36 fish limit over 3 days. Maggie caught 7 fish on the first day. Which is an inequality representing the number of fish $f$ Maggie can catch on the second and third days?
- A $f + 7 \leq 36$
- B $f - 7 \leq 36$
- C $f + 7 \geq 36$
- D $f - 7 \geq 36$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.03 (continued)

Use the following information for Questions 11 and 12.
Edmund and two of his friends plan to go to a basketball game at Duke. The three friends anticipate that they will spend at least $135 between the three of them at the game.

11 If they split the costs equally, which inequality represents the cost $c$ for each of the friends?
   - A $3c \geq 135$
   - B $3c < 135$
   - C $\frac{c}{3} \geq 135$
   - D $\frac{c}{3} < 135$

12 What will be the cost per friend?
   - A less than $45$
   - B $45$ or more
   - C no more than $45$
   - D greater than $45$

Use the following information for Questions 13 and 14.
Rylee bought a lantana bush and 3 azalea plants at a nursery. She paid less than $52 for all the plants. She knows she paid $38 for the 3 azalea plants.

13 Which inequality could she use to determine the amount she paid for the lantana bush, $b$?
   - A $b - 38 \leq 52$
   - B $b - 38 < 52$
   - C $b + 38 < 52$
   - D $b + 38 \leq 52$

14 How much did Rylee pay for the lantana bush?
   - A at least $14$
   - B less than $14$
   - C about $66$
   - D more than $66$

15 Jerrod has $12.50 in his pocket and wants to buy a DVD. If sales tax is 7%, which inequality could Jerrod use to find the price of a DVD $d$ that he can afford?
   - A $0.07d \leq 12.50$
   - B $\frac{1.07}{d} \leq 12.50$
   - C $d \leq 12.50 + 0.07$
   - D $1.07d \leq 12.50$
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**OBJECTIVE 5.04** Use graphs, tables, and symbols to model and solve problems involving rates of change and ratios.

For Questions 1–3, use the table below that shows the number of boys and girls in the 7th and 8th grades who are in the marching band.

<table>
<thead>
<tr>
<th>Seventh Graders</th>
<th>Eighth Graders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>6</td>
</tr>
<tr>
<td>Girls</td>
<td>5</td>
</tr>
</tbody>
</table>

1 What is the ratio of seventh-grade male band members to seventh-grade female band members?
   A 7:8  B 8:7  C 6:5  D 5:6

2 What is the ratio of seventh-grade band members to eighth-grade band members?
   A 15:11  B 11:15  C 6:7  D 5:8

3 What is the ratio of eighth-grade female band members to total eighth-grade band members?
   A 8:26  B 8:7  C 8:15  D 7:15

4 This graph shows the temperature in New Bern on a given day. How many degrees did the temperature drop per hour from 1 P.M. to 5 P.M.?
   A 1  B 2  C 4  D 8
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.04 (continued)

5 A baby weighed 8 pounds when he was born. He gained 2 pounds over the next 4 weeks. What was the rate of change of his weight per week?

A $\frac{1}{2}$ pound
B 1 pound
C 2 pounds
D 4 pounds

6 About how much does Geri’s salary increase per year?

A $3,000
B $6,000
C $9,000
D $15,000

7 If her salary continues to increase at approximately the same constant rate, what salary would you predict Geri to receive after she has worked on this job for 10 years?

A $28,000
B $30,000
C $34,000
D $37,000

8 A plant catalog sells 1 coreopsis plant for $9.00 or a set of 3 plants for $21.00. How much would it cost to order 10 coreopsis plants from this company?

A $90
B $84
C $72
D $63

For Questions 6 and 7, use the graph at the right that shows Geri’s salary.

Gertrude’s Salary

<table>
<thead>
<tr>
<th>Years on Job</th>
<th>Salary ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20,000</td>
</tr>
<tr>
<td>1</td>
<td>30,000</td>
</tr>
<tr>
<td>2</td>
<td>40,000</td>
</tr>
<tr>
<td>3</td>
<td>50,000</td>
</tr>
<tr>
<td>4</td>
<td>60,000</td>
</tr>
<tr>
<td>5</td>
<td>70,000</td>
</tr>
<tr>
<td>6</td>
<td>80,000</td>
</tr>
</tbody>
</table>

North Carolina End-of-Grade Test, Grade 6 99
Standards Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

OBJECTIVE 5.04 (continued)

For Questions 9–11, use the graph. The Humanities Club sold gift wrap for a fund-raiser. Their profits for 5 select years are shown in the graph.

9 Between which years was the rate of change per year the greatest?
   A 1997 and 1998
   B 1998 and 2000
   C 2000 and 2003
   D 2003 and 2004

10 What was the rate of change of profits per year between 2000 and 2003?
   A $75
   B $100
   C $200
   D $300

11 Suppose the Humanities Club continues to have fund-raisers in the future. If the rate of change of their profits from 2004 to 2006 is $300 per year, what will their profit be in 2006?
   A $1,450
   B $1,500
   C $1,600
   D $1,900

12 A packet of marigold seeds sells for $2.95. At a special sale you can buy 4 packs of marigold seeds for $8.95. If you buy 4 packs at the sale price, how much money would you save over the regular price?
   A $2.85
   B $2.95
   C $8.95
   D $11.80
Sample Test

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Which statement is true?
   A \( \frac{9}{4} < \frac{11}{5} \)  
   B \( \frac{9}{4} = 9.4 \)  
   C \( \frac{9}{4} > \frac{11}{5} \)  
   D \( \frac{9}{4} = \frac{3}{2} \)

For Questions 2 and 3, use the figure below.

2 What is the area of the figure?
   A 22 square units  
   B 24 square units  
   C 28 square units  
   D 36 square units

3 What is the perimeter of the figure?
   A 36 units  
   B 27 units  
   C 24 units  
   D 22 units

4 Sean, Keanu, and Reggie tried out for the male lead in the school musical, and Lorelei, Jennifer, and Sun Lee tried out for the female lead. If they all have an equal chance of getting the parts, what is the probability that Keanu and Lorelei get the roles?
   A \( \frac{1}{9} \)  
   B \( \frac{1}{6} \)  
   C \( \frac{1}{3} \)  
   D \( \frac{1}{2} \)

5 Which statement is true?
   A \( -7 > -6 \)  
   B \( -11 \frac{1}{2} > -11 \)  
   C \( -\frac{2}{3} > -\frac{1}{2} \)  
   D \( -\frac{1}{3} > -\frac{3}{4} \)

6 What is the solution of \( x + 6 = 9 \)?
   A 15  
   B 9  
   C 3  
   D \( \frac{3}{2} \)
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information to answer Questions 7–9.

A cabinet contains DVDs. There are 6 adventure movies, 4 science fiction movies, 3 mysteries, and 2 comedies.

7 If 2 DVDs are selected from the cabinet at random, what is the probability that the first one is science fiction and the second one is a comedy? The first is not replaced before the second is chosen.

A \( \frac{8}{15} \)  
B \( \frac{1}{4} \)  
C \( \frac{4}{105} \)  
D \( \frac{8}{225} \)

8 If 2 DVDs are selected from the cabinet at random, what is the probability that the first one is science fiction and the second one is a comedy? The first one is replaced in the cabinet before a DVD is chosen again.

A \( \frac{8}{15} \)  
B \( \frac{1}{4} \)  
C \( \frac{4}{105} \)  
D \( \frac{8}{225} \)

9 Which statement is true?

A The situation in question 7 involves dependent events while that in question 8 involves independent events.
B The situation in question 7 involves independent events while that in question 8 involves dependent events.
C Both situations involve dependent events.
D Both situations involve only independent events.

10 The population of Greensboro changed from about 224,000 in 2000 to about 225,000 in 2002. What was the rate of change of the population per year?

A 1,000  
B 500  
C 250  
D 100

11 Which number is negative three-fourths times 12?

A \( -\frac{3}{4} \)  
B -6  
C -9  
D -16
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information to answer Questions 12–14.

Maria tossed 2 6-sided number cubes 36 times. She recorded the sum of the number cubes as shown in the table. Then she calculated the theoretical probability of each sum and wrote that in the third column.

<table>
<thead>
<tr>
<th>Sum</th>
<th>Number of Times Occurred</th>
<th>Theoretical Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>1/36</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1/18</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>1/12</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>1/9</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>5/36</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>1/6</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>5/36</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>1/9</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>1/12</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>1/18</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>1/36</td>
</tr>
</tbody>
</table>

12 Which of these sums in Maria’s experiment has the same experimental probability as the theoretical probability?
A 2  
B 3  
C 7  
D 11

13 Which of these sums in Maria’s experiment has a greater experimental probability than the theoretical probability?
A 2  
B 3  
C 6  
D 11

14 Which of these sums in Maria’s experiment has a smaller experimental probability than the theoretical probability?
A 2  
B 3  
C 7  
D 11

15 Estimate the measure of angle x of the door shown.
A 45  
B 60  
C 90  
D 180
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

For Questions 16–18, use ∆MON.

16 What are the coordinates of the vertices of ∆MON?
   A (0, 4), (−3, −2), (3, −2)  
   B (4, 0), (−2, 3), (2, 3)  
   C (0, 4), (−3, 2), (3, 2)  
   D (0, 4), (−2, 3), (−2, −3)

17 What is the area of ∆MNO?
   A 9  
   B 18  
   C 24  
   D 36

18 What will the coordinates of the image of M be if ∆MNO is translated 4 units to the right?
   A (0, 0)  
   B (−4, 0)  
   C (4, 4)  
   D (−4, 4)

19 Which list is in order from least to greatest?
   A \( \frac{1}{4}, \frac{1}{3}, \frac{7}{8}, \frac{3}{5} \)  
   B \( \frac{1}{3}, \frac{1}{4}, \frac{3}{5}, \frac{7}{8} \)  
   C \( \frac{3}{5}, \frac{1}{8}, \frac{1}{4}, \frac{1}{3} \)  
   D \( \frac{1}{4}, \frac{1}{3}, \frac{3}{5}, \frac{7}{8} \)

20 Suppose an airline is selling a seat on a flight from Chicago to Charlotte for $99. Which expression is equivalent to this fare?
   A \( 3^4 \)  
   B \( 3 \times 7 \times 11 \)  
   C \( 3^3 \times 7 \)  
   D \( 3^2 \times 11 \)

21 Shehera can do her first degree black belt form containing 81 moves in 120 seconds. Assuming it takes about the same amount of time to do each move, which is an estimate of the time it would take her to do the first 10 moves?
   A 8 seconds  
   B 10 seconds  
   C 12 seconds  
   D 15 seconds
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information to answer Questions 22 and 23.
Arnold deposited $100 in a savings account. Then each week he deposited an additional $20 without withdrawing any money. Ignore interest.

22 Which expression gives the amount of money Arnold has in his account after \( x \) weeks?
- A \( 100 + 20 + x \)
- B \( 120x \)
- C \( 100 + 20x \)
- D \( 100x + 20 \)

23 How much money will Arnold have in his savings account after 8 weeks?
- A $128
- B $260
- C $820
- D $960

24 Bailey has a coupon for a discount of 20% on a ski package. The package normally costs $87.50. Which of these strategies can she use to determine the cost of the ski package if she uses the coupon?
- A Convert 20% to 0.20, then multiply 0.20 and 87.50.
- B Convert 20% to 0.20, and then subtract the product of 0.20 and 87.50 from 87.50.
- C Convert 20% to 0.20, then add the product of 0.20 and 87.50 to 87.50.
- D Convert 20% to \( \frac{1}{5} \), then divide 87.50 by \( \frac{1}{5} \).

25 Which is \( 33\frac{1}{3} \) percent written as a fraction?
- A \( \frac{3}{10} \)
- B 0.3
- C \( \frac{33}{100} \)
- D \( \frac{1}{3} \)

26 Which statement is true about \( 6 \div \frac{1}{2} \)?
- A The quotient is greater than 10.
- B The quotient is less than 4.
- C The quotient is equal to 2.
- D The quotient is less than 1.
Sample Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

27 Tracy divided 2,565 by 4,000,000 on his calculator. The calculator showed an answer of $6.4125 \times 10^{-4}$. What is this number in standard form?
   A 64,125  
   B 6,412.5  
   C 0.0064125  
   D 0.00064125

28 If the circumference of a circle is $20\pi$ meters, what is the radius?
   A 5 meters  
   B 10 meters  
   C 20 meters  
   D 40 meters

29 Jacob, Alfonso, and Brad are having a race on the beach at Cape Hatteras. The tree diagram shows the orders in which they can finish. How many permutations, or outcomes, are in the sample space?

   1st  Jacob  Alfonso  Brad
   2nd  Alfonso  Brad  Jacob  Alfonso  Jacob
   3rd  Brad  Alfonso  Brad  Jacob  Jacob  Alfonso

   A 3  
   B 6  
   C 12  
   D 15

30 What property is illustrated by the equation $18 + 0 = 0 + 18$?
   A Commutative Property of Addition  
   B Associative Property of Addition  
   C Identity Property of Addition  
   D Distributive Property

31 If about 75 percent of the apples in a basket are red and there are 21 apples in the basket, which is a reasonable estimate of the number of red apples in the basket?
   A 5  
   B 10  
   C 12  
   D 15
Sample Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information to answer Questions 32 and 33.
Humphrey is planning a flower garden around 3 sides of his backyard as shown. The garden is to be 3 feet wide all around.

32 What is the area of the flower garden?
A 420 square feet  
B 642 square feet  
C 660 square feet  
D 4,800 square feet

33 Humphrey wants to put a decorative fence around the inside 3 edges of the garden (indicated by dotted lines on the figure). How many feet of fence does he need?
A 208 feet  
B 220 feet  
C 280 feet  
D 480 feet

For Questions 34 and 35, Yolanda is serving orange juice to her friends.

34 If $x$ girls have glasses that hold 6 ounces of juice and $y$ girls have 8-ounce glasses, which expression gives the total number of ounces of orange juice that Yolanda will need for her friends?
A $6x + 8y$  
B $8x + 6y$  
C $14xy$  
D $14 + x + y$

35 How many ounces of juice will Yolanda need if $x = 4$ and $y = 6$?
A 24 ounces  
B 68 ounces  
C 72 ounces  
D 336 ounces

36 Claristella has 8 pairs of gym shoes, 10 pairs of socks, and 3 pairs of shoelaces. Which expression gives the number of ways she can choose a pair of shoes, socks, and shoelaces to wear?
A $(8 + 10) \times 3$  
B $8 + 10 + 3$  
C $8 \times 10 \times 3$  
D $8 \times (10 + 3)$
Sample Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

37 Jacques is climbing the stairs in the Bank of America tower in Charlotte. The time it takes him to climb is shown in the graph. If his rate stays approximately constant, about how many minutes will it take him to climb 250 steps?

A 3 minutes  
B 4 minutes  
C 5 minutes  
D 7 minutes

Use the following information to answer Questions 38–40.

One card is drawn from this group of cards: king of clubs, queen of spades, jack of diamonds, jack of hearts, ace of hearts, and 10 of hearts.

38 What is the probability that the card is a king?

A \(\frac{1}{6}\)  
B \(\frac{1}{4}\)  
C \(\frac{1}{3}\)  
D \(\frac{1}{2}\)

39 What is the probability that the card is a heart?

A \(\frac{1}{6}\)  
B \(\frac{1}{4}\)  
C \(\frac{1}{3}\)  
D \(\frac{1}{2}\)

40 What is the probability that the card is a jack?

A \(\frac{1}{6}\)  
B \(\frac{1}{4}\)  
C \(\frac{1}{3}\)  
D \(\frac{1}{2}\)

41 What is the solution of the inequality \(-2b > 16\)?

A \(b > 18\)  
B \(b < 8\)  
C \(b > -8\)  
D \(b < -8\)
Sample Test (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

42 What is the distance around a circle called?  
A pi  
B arc  
C area  
D circumference

For Questions 43–45, use the circle shown on the graph.

43 What is the intersection of $BD$ and the circle?  
A $(3, 4), (-3, -4)$  
B $(3, 4), (-4, -3)$  
C $(0, 0)$  
D $(3, 4), (0, 0)$

44 What is the intersection of $\triangle ABC$ and the circle?  
A $(-3, -4), (3, 4)$  
B $(-3, 4), (3, 4), (3, -4)$  
C $(-3, 4), (3, 4), (3, -4), (0, 0)$  
D $(3, 4)$

45 $BD$ intersects $\triangle ABC$ at $(3, 4)$ and at what other point?  
A $(-3, -4)$  
B $(1, 2)$  
C $(0, 0)$  
D $(3, -4)$

46 Which point could be the graph of $-2\frac{1}{2}$?  
A $A$  
B $B$  
C $C$  
D $D$
For Questions 47–49, use the table that shows the types of animals that are on the Dentzel Menagerie Carousel in Burlington.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>lion</td>
<td>1</td>
</tr>
<tr>
<td>tiger</td>
<td>1</td>
</tr>
<tr>
<td>giraffe</td>
<td>1</td>
</tr>
<tr>
<td>reindeer</td>
<td>1</td>
</tr>
<tr>
<td>pig</td>
<td>4</td>
</tr>
<tr>
<td>rabbit</td>
<td>4</td>
</tr>
<tr>
<td>ostrich</td>
<td>4</td>
</tr>
<tr>
<td>cat</td>
<td>4</td>
</tr>
<tr>
<td>horse</td>
<td>26</td>
</tr>
</tbody>
</table>

47 If one animal is selected at random, what is the probability that it is a lion or a tiger?

A $\frac{2}{3}$  
B $\frac{2}{9}$  
C $\frac{1}{23}$  
D $\frac{1}{81}$

48 If one animal is selected at random, what is the probability that it is a horse or a cat?

A $\frac{15}{23}$  
B $\frac{2}{9}$  
C $\frac{1}{13}$  
D $\frac{52}{1,035}$

49 If 2 animals are selected at random, which fractions would you multiply to find the probability that both are horses?

A $\frac{26}{46} \times \frac{26}{46}$  
B $\frac{26}{46} \times \frac{25}{45}$  
C $\frac{26}{46} \times 2$  
D $\frac{26}{46} \times \frac{25}{46}$

50 A centerpiece contains 6 white roses and 4 red carnations. If 1 flower is chosen at random, what is the probability that it is a red carnation?

A $\frac{3}{5}$  
B $\frac{1}{2}$  
C $\frac{2}{5}$  
D $\frac{1}{4}$
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

51 For which problem would a calculator be needed the most?
   A  $7 \times 10$
   B  $11 \times \frac{1}{11}$
   C  $2,500 \div 100$
   D  $117 \times 356$

52 What is the greatest common factor of 72 and 20?
   A  2
   B  4
   C  8
   D  12

53 Illa surveyed her class members about how many pets they have. Which would be the best way to report her results?
   A  Make a video tape showing some class members with their pets.
   B  Type a list of the numbers.
   C  Make a poster with pictures of her classmates and their pets.
   D  Draw a bar graph showing the data.

54 How many ways can the letters in the word TAR be arranged?
   A  1
   B  2
   C  3
   D  6

55 Which figure shows 50 percent of the rectangle shaded?
   A
   B
   C
   D
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

56 Which group should a bank survey about their interest in debit cards?
   A A random sample of sixth graders.
   B A random sample of adults.
   C A random sample of babies.
   D A random sample of retired former bank employees.

57 What is the sum of \(356 + 28 + 177\)?
   A 401
   B 561
   C 570
   D 813

For Questions 58 and 59, use the circular Cherokee basket shown.

58 What is the circumference of the bottom of the basket?
   A \(4\pi\) inches
   B \(8\pi\) inches
   C \(16\pi\) inches
   D \(32\pi\) inches

59 What is the area of the bottom of the basket?
   A \(4\pi\) square inches
   B \(8\pi\) square inches
   C \(16\pi\) square inches
   D \(32\pi\) square inches

60 Which of these numbers is greatest?
   A \(-40\)
   B \(-7\)
   C \(-2\)
   D \(-10\)
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

61 Which is the greatest in this circle?

- A radius
- B diameter
- C chord $JK$
- D circumference

62 If $\triangle PQR$ is reflected over the $y$-axis, what are the coordinates of the image of $P$?
- A $(-4, -1)$
- B $(4, -1)$
- C $(1, -4)$
- D $(4, 1)$

63 If $\triangle PQR$ is reflected over the $x$-axis, what are the coordinates of the image of $P$?
- A $(-4, -1)$
- B $(4, -1)$
- C $(1, -4)$
- D $(4, 1)$

64 What is the solution of $12x + 7 = 19$?
- A 0
- B 1
- C $\frac{13}{6}$
- D 14

65 A car dealer wants to conduct a random survey to find out how many people might be interested in buying a convertible within the year. Which group should she survey?
- A A random sample of sixth graders.
- B A random sample of high school students.
- C A random sample of recent college graduates.
- D A random sample of unemployed adults.
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

66 Patima was riding her motorcycle from Asheville to Wilmington at a constant speed. The time she rode and distance traveled are shown in this table. If she continued at the same constant speed, how far would she go in 5 hours?

<table>
<thead>
<tr>
<th>Time</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 hours</td>
<td>20 miles</td>
</tr>
<tr>
<td>2 hours</td>
<td>80 miles</td>
</tr>
<tr>
<td>3 hours</td>
<td>120 miles</td>
</tr>
</tbody>
</table>

A 100 miles  B 125 miles  C 150 miles  D 200 miles

67 What transformation maps \( \triangle GHJ \) onto \( \triangle G'H'J' \)?

A reflection  B rotation  C translation  D dilation

68 Which statement about \( 1.5 \times 10 \) is true?

A The product is greater than 10.
B The product is equal to 10.
C The product is less than 10.
D The product is not a whole number

69 A rectangle has vertices located at \((6, 2), (6, 4), \) and \((-3, 4)\). In what quadrant is the fourth vertex?

A I  B II  C III  D IV

70 Which statement is true?

A \( \frac{1}{2} < \frac{7}{8} \)  B \( 0.9 > \frac{11}{12} \)
C \( \frac{1}{4} < \frac{1}{8} \)  D \( 75\% > \frac{7}{8} \)
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

71 Which number is a multiple of 6, 8, and 10?  
   A 2  
   B 24  
   C 60  
   D 120  

72 Which is a reasonable estimate of 2,526,856 divided by 249?  
   A 1,000  
   B 10,000  
   C 100,000  
   D 1,000,000  

73 Huang simplified \( \frac{9}{11001} \) to 9. What property did he use?  
   A Identity Property of Addition  
   B Identity Property of Multiplication  
   C Commutative Property of Addition  
   D Additive Inverse Property  

74 Which is the least number?  
   A \( \frac{3}{5} \)  
   B \( \frac{1}{4} \)  
   C \( \frac{7}{9} \)  
   D \( \frac{1}{3} \)  

75 Channel bass have been found that weigh 75 pounds. What is the prime factorization of 75?  
   A \( 7 \times 5 \)  
   B \( 3 \times 5^2 \)  
   C \( 3^2 \times 5 \)  
   D \( 25 \times 3 \)  

76 For which problem would an estimate be sufficient?  
   A The number of pieces of chicken needed for a party.  
   B The number of players on the ice for a team in an ice hockey game.  
   C The number of points needed to get an A on a test.  
   D The number of tickets for 10 friends to ride the Great Smoky Mountain Railroad.
A marine fossil at the Aurora Fossil Museum is 15 million years old. How is this number written in scientific notation?

- $A \quad 1.5 \times 10^7$
- $B \quad 1.5 \times 10^6$
- $C \quad 1.5 \times 10^5$
- $D \quad 1.5 \times 10^4$

Simplify $22 - 3 \times 6 + 8 \div 2$.

- $A \quad 118$
- $B \quad 61$
- $C \quad 8$
- $D \quad 6$

Which factor tree shows the prime factorization of 60?

- $A$
- $B$
- $C$
- $D$

What is the intersection of 2 diameters of a circle called?

- $A \quad$ the center of the circle
- $B \quad$ the radius of the circle
- $C \quad$ 2 perpendicular chords of the circle
- $D \quad$ the circumference of the circle

STOP