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

Includes:
• 2003 North Carolina Course of Study Content Standards, Grade 7
• 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.
- 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 7 North Carolina End-of-Grade (EOG) Test.

It contains:

• a Student Recording Chart,
• the 2003 North Carolina Content Standards, Grade 7,
• 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 7 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 85 to 100.
**Student Recording Chart**

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

<table>
<thead>
<tr>
<th>Strand</th>
<th>Number and Operations</th>
<th>Measurement</th>
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<td>9 ( \square ) 22 ( \square )</td>
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<td>Practice Pages</td>
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<table>
<thead>
<tr>
<th>Strand</th>
<th>Data Analysis and Probability</th>
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<tr>
<td>Standard</td>
<td>4.01</td>
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<tr>
<td>Test Questions</td>
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<td>Need Practice?</td>
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<table>
<thead>
<tr>
<th>Strand</th>
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<tbody>
<tr>
<td>Standard</td>
<td>5.01</td>
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<tr>
<td>Test Questions</td>
<td>15 ( \square ) 59 ( \square )</td>
</tr>
<tr>
<td>Need Practice?</td>
<td>Practice Pages</td>
</tr>
</tbody>
</table>
# Competency Goals and Objectives

## COMPETENCY GOAL 1: The learner will understand and compute with rational numbers.

1.01 Develop and use ratios, proportions, and percents to solve problems.

1.02 Develop fluency in addition, subtraction, multiplication, and division of rational numbers.
   - (a) Analyze computational strategies.
   - (b) Describe the effect of operations on size.
   - (c) Estimate the results of computations.
   - (d) Judge the reasonableness of solutions.

1.03 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

## COMPETENCY GOAL 2: The learner will understand and use measurement involving two- and three-dimensional figures.

2.01 Draw objects to scale and use scale drawings to solve problems.

2.02 Solve problems involving volume and surface area of cylinders, prisms, and composite shapes.

## COMPETENCY GOAL 3: The learner will understand and use properties and relationships in geometry.

3.01 Using three-dimensional figures:
   - (a) Identify, describe, and draw from various views (top, side, front, corner).
   - (b) Build from various views.
   - (c) Describe cross-sectional views.

3.02 Identify, define, and describe similar and congruent polygons with respect to angle measures, lengths of sides, and proportionality of sides.

3.03 Use scaling and proportional reasoning to solve problems related to similar and congruent polygons.

## COMPETENCY GOAL 4: The learner will understand and use graphs and data analysis.

4.01 Collect, organize, analyze, and display data (including box plots and histograms) to solve problems.

4.02 Calculate, use, and interpret the mean, median, mode, range, frequency distribution, and inter-quartile range for a set of data.

4.03 Describe how the mean, median, mode, range, frequency distribution, and inter-quartile range of a set of data affect its graph.

4.04 Identify outliers and determine their effect on the mean, median, mode, and range of a set of data.
## Competency Goals and Objectives

<table>
<thead>
<tr>
<th>4.05</th>
<th>Solve problems involving two or more sets of data using appropriate statistical measures.</th>
</tr>
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<tbody>
<tr>
<td><strong>COMPETENCY GOAL 5</strong>: The learner will demonstrate an understanding of linear relations and fundamental algebraic concepts.</td>
<td></td>
</tr>
<tr>
<td>5.01</td>
<td>Identify, analyze, and create linear relations, sequences, and functions using symbols, graphs, tables, diagrams, and written descriptions.</td>
</tr>
<tr>
<td>5.02</td>
<td>Translate among different representations of algebraic expressions, equations and inequalities.</td>
</tr>
<tr>
<td>5.03</td>
<td>Use and evaluate algebraic expressions, linear equations or inequalities to solve problems.</td>
</tr>
<tr>
<td>5.04</td>
<td>Develop fluency in the use of formulas to solve problems.</td>
</tr>
</tbody>
</table>
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.

For Questions 1 and 2, use the table showing the number of states in the United States that have each bird as their state bird.

<table>
<thead>
<tr>
<th>State Bird</th>
<th>Cardinal</th>
<th>Western Meadowlark</th>
<th>Mockingbird</th>
<th>Robin</th>
<th>Bluebird</th>
<th>Common Loon</th>
<th>Baltimore Oriole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of States</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

1 What bird is the mode? 4.01
   A Cardinal          B Bluebird
   C Western Meadowlark D Mockingbird

2 Which graph shows this data? (C = Cardinal, WM = Western Meadowlark, M = Mockingbird, R = Robin, B = Bluebird, CL = Common Loon, BO = Baltimore Oriole) 4.01
   A
   B
   C
   D

3 What is the probability of getting 2 heads when 2 fair coins are tossed? 3
   A \( \frac{1}{2} \)          B \( \frac{1}{3} \)
   C \( \frac{1}{4} \)          D \( \frac{1}{6} \) 1.03

4 There are 8 bears, 6 elephants, and 10 tigers at the zoo. What is the ratio of bears to tigers? 1.01
   A 1:3          B 2:5
   C 3:4          D 4:5

5 The angle measure between the roads from Goldsboro to Wilson and Goldsboro to Smithfield on a map is approximately 70°. If the angle measure between U.S. 220 and I-85 at Greensboro is about half as many degrees, which is an estimate of this angle measure? 2.01
   A 140          B 90
   C 60          D 35
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.

6 \( \triangle XYZ \) is congruent to \( \triangle PQR \). If \( m\angle Y = 30 \) and \( m\angle Z = 100 \), what is \( m\angle P? \) 3.03

A 30  B 50  C 100  D 130

7 Which table shows the data on the graph? (B = Bear, C = Cougar, Rc = Raccoon, D = Deer, Rb = Rabbit, O = Opossum) 5.04

![Graph of Length of Animals](image)

<table>
<thead>
<tr>
<th>Animal</th>
<th>Length</th>
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<tbody>
<tr>
<td>Bear</td>
<td>60 inches</td>
</tr>
<tr>
<td>Cougar</td>
<td>72 inches</td>
</tr>
<tr>
<td>Raccoon</td>
<td>16 inches</td>
</tr>
<tr>
<td>Deer</td>
<td>55 inches</td>
</tr>
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<td>Rabbit</td>
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<td>Rabbit</td>
<td>30 inches</td>
</tr>
<tr>
<td>Opossum</td>
<td>10 inches</td>
</tr>
</tbody>
</table>

8 Which pair of figures could have congruent cross-sections? 3.01

A cone and pyramid  B cone and prism  C sphere and cone  D sphere and pyramid

9 What effect does multiplying a counting number by \( \frac{1}{3} \) have? 1.02

A It makes the number smaller.  B It makes the number greater.  C It increases the number by 3.  D It decreases the number by 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.

10 How many feet are equal to 6 feet 3 inches? 1.03
   A 6.25 feet  
   B 6.3 feet  
   C 7.5 feet  
   D 63 feet

11 The figure shows a scale drawing of Murphy’s triangular lot. Which would be a possible length for side $AC$? 2.01

![Diagram of triangle ABC with sides 50 ft and 70 ft]
   A 50 feet  
   B 100 feet  
   C 200 feet  
   D 500 feet

12 If $A'B'$ is the image of $AB$ under a dilation of magnitude $\frac{1}{3}$, and $A'B' = 6$ millimeters, what is $AB$? 3.03
   A 18 millimeters  
   B 12 millimeters  
   C 3 millimeters  
   D 2 millimeters

13 The graph shows the path of a frog’s hop. Which appears to be true from the graph? 5.02

![Graph showing horizontal distance vs. height]
   A It takes the frog 30 seconds to complete 1 hop.  
   B The frog’s hop height keeps increasing as his distance increases.  
   C The maximum height the frog reaches above the ground is 30 inches.  
   D The frog is higher above the ground at a horizontal distance of 20 inches than at a horizontal distance of 5 inches

14 What are 2 polygons called if they are the same shape and the same size? 3.02
   A congruent  
   B similar but not congruent  
   C isometric  
   D reflections of each other
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.

15 What is the solution of $5x = 35$?  
- A 5
- B 7
- C 30
- D 175

For Questions 16 and 17, use the cylinder.

16 Which would be a top view of the cylinder?  
- A  
- B  
- C  
- D  

17 Which would be a side view of the cylinder?  
- A  
- B  
- C  
- D  

18 What is the percent of increase from $60^\circ$ to $90^\circ$?  
- A 30%
- B 50%
- C 70%
- D 150%

19 Maurice bought 10 similar woodcarvings for $220. What was the likely price for each woodcarving?  
- A $11
- B $16
- C $22
- D $28
20 Autumn is buying mugs with her company insignia on them to give out as holiday gifts. The mugs cost $5 each plus a one-time charge of $30 to set up the company logo. Which formula could be used to find the cost $y$, of $x$ mugs?  
\[ A \ y = 5x + 30 \]  
\[ B \ y = 35x \]  
\[ C \ y = 30x + 5 \]  
\[ D \ y = 5 + x + 30 \]  

21 What is 30 percent of 72?  
\[ A \ 240 \]  
\[ B \ 50.4 \]  
\[ C \ 42 \]  
\[ D \ 21.6 \]  

22 Jack can fit 20 reams of paper into a box. He calculates that he needs 4.3 boxes to pack 86 reams. What is a more reasonable answer to the requirement?  
\[ A \ 4 \text{ boxes} \]  
\[ B \ 5 \text{ boxes} \]  
\[ C \ 6 \text{ boxes} \]  
\[ D \ 16 \text{ boxes} \]  

23 Which triangles appear to be similar?  
\[ A \ \]  
\[ B \ \]  
\[ C \ \]  
\[ D \ \]  

24 If the length of a rectangle is 8 inches and the width 4 inches, which rectangle appears to be drawn to scale?  
\[ A \ \]  
\[ B \ \]  
\[ C \ \]  
\[ D \ \]
For Questions 25–29, use the following bowling scores:
70, 78, 83, 90, 110, 110, 122, 124, 128, 130, 145, 156, 174, 180, 205.

25 What is the mean? 4.04
   A  110    B  124
   C  127    D  135

26 What is the median? 4.04
   A  110    B  124
   C  127    D  135

27 What is the mode? 4.04
   A  135    B  127
   C  124    D  110

28 What is the interquartile range? 4.04
   A  66    B  70
   C  90    D  110

29 To be an outlier a bowling score would have to be greater than what number? 4.04
   A  99    B  127
   C  205   D  255

30 Suppose $\frac{3}{10}$ of the people in Goldsboro stay home for New Year’s Eve. If the population of Goldsboro is between 39,000 and 41,000, which is a reasonable estimate of the number of people who stay home? 1.02
   A  4,000 people    B  6,000 people
   C  9,000 people    D  12,000 people

31 What is the lateral surface area of a cylindrical potato chip can that is 10 inches tall and has a diameter of 3 inches? 2.02
   A  $15\pi$ square inches
   B  $30\pi$ square inches
   C  $45\pi$ square inches
   D  $60\pi$ 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.

For Questions 32 and 33, use the graph showing the number of bachelor’s degrees earned in the United States.

![U.S. Bachelor’s Degrees Earned](image)

32 Between which years did the number of degrees to women increase the most? 4.05
   A 1928 and 1949
   B 1949 and 1969
   C 1969 and 1989
   D 1989 and 2002

33 The number of women who received bachelor’s degrees in 2002 is about how many times the number of men who received bachelor’s degrees in 1928? 4.05
   A 10
   B 25
   C 35
   D 50

For Questions 34–36, use the following information.

The chess club at Central Junior High School sold candy as a fund-raiser. Each of the 20 club members made a $15 profit for the club from the candy sale. The club used the money raised as shown in the circle graph.

34 How much did the chess club spend for its pizza party? 4.01
   A $25
   B $60
   C $75
   D $90

35 How much more did the chess club spend for transportation than for supplies? 4.01
   A $15
   B $30
   C $45
   D $60

36 The chess club needs to buy 10 awards. What is the average price it can spend for each award? 4.01
   A $3
   B $9
   C $15
   D $90
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 Given the formula $h = 16t^2 + 4t - 6$, what is $h$ when $t$ equals 3?  
A $2310$  
B $156$  
C $150$  
D $54$  

38 What is the best estimate for the dimensions of the kitchen on the floor plan?  
A 16 feet by 30 feet  
B 8 feet by 15 feet  
C 4 feet by 5.5 feet  
D 4 feet by 7.5 feet  

39 What is the best estimate for the area of the family room on the floor plan?  
A 75 square feet  
B 100 square feet  
C 150 square feet  
D 300 square feet  

40 Which change in the graph would cause the median to be 27?  
A Add another state with 29 hazardous waste sites.  
B Add another state with 27 hazardous waste sites.  
C Add another state with 25 hazardous waste sites.  
D Add another state with 19 hazardous waste sites.  

41 Wilhelmina earns $6.50 an hour shelving books at the library. She gets $9.75 an hour on holidays. During the first week of July she worked 40 hours including 6 hours on the Fourth of July. How much money did she earn that week?  
A $318.50  
B $310  
C $299  
D $279.50
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.

42 The figure below is the top view of which solid? 3.01

![Diagram of solids]

A
B
C
D

43 Which school had the lowest student to faculty ratio? 4.05

A Western Carolina University
B NC State University.
C Wake Forest University
D UNC Asheville

44 Which statement is true? 4.05

A The same school had the median number of students as had the median number of faculty.
B Western Carolina University had the median number of students, and Wake Forest University had the median number of faculty.
C Wake Forest University had the median number of students, and Western Carolina University had the median number of faculty.
D UNC Charlotte had the median number of students, and UNC Pembroke had the median number of faculty.
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.

45 Abigail wants to make a copy of her birth certificate and shrink it so it will fit in her wallet. The original birth certificate is 5 inches by 6 inches. Her wallet holds pictures $2\frac{1}{2}$ inches by 3 inches. What scale factor must Abigail use?  
A 50%  
B 75%  
C 100%  
D 200%  

46 Yvonne went to the ice cream parlor with 2 girlfriends. Her friends had sodas that cost $3.25 each. Yvonne had a banana split for $3.50. How much was the total bill before tax?  
A $6.75  
B $9.75  
C $10.00  
D $10.50  

47 What is the surface area of the cube?  
A 512 square centimeters  
B 384 square centimeters  
C 256 square centimeters  
D 128 square centimeters  

Use the following information to answer Questions 48 and 49.  
$A = 2.50x + 5.00y$ gives the amount of money $A$ made at the school musical if $x$ student tickets are sold for $2.50 each and $y$ adult tickets are sold for $5$ each.

48 How much will the school make if 100 adult and 300 student tickets are sold?  
A $1,250  
B $1,750  
C $2,000  
D $2,500  

49 How many student tickets must the school sell if they sell 200 adult tickets and need to make $2,000 to cover the expenses of the musical?  
A 400  
B 300  
C 200  
D 100
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 50–53, use the table of the number of strokes for par at several North Carolina golf courses.

<table>
<thead>
<tr>
<th>Golf Course</th>
<th>Number of Strokes for Par</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearl Golf Links</td>
<td>72</td>
</tr>
<tr>
<td>Grassy Creek</td>
<td>72</td>
</tr>
<tr>
<td>Mt. Mitchell</td>
<td>72</td>
</tr>
<tr>
<td>Smoky Mountain Country Club</td>
<td>71</td>
</tr>
<tr>
<td>Sherwood Forest</td>
<td>54</td>
</tr>
<tr>
<td>Pinehurst #1</td>
<td>70</td>
</tr>
<tr>
<td>Nags Head</td>
<td>71</td>
</tr>
<tr>
<td>Sapphire Mountain</td>
<td>70</td>
</tr>
</tbody>
</table>

50 What is the median par for these courses? 4.02
A 18  B 69  C 71  D 72

51 What is the mode? 4.02
A 18  B 69  C 71  D 72

52 What is the mean? 4.02
A 18  B 69  C 71  D 72

53 What is the range? 4.02
A 18  B 69  C 71  D 72

54 Emily bought a car for $20,000 5 years ago. Her car is now worth $8,000. What is the percent of decrease? 1.01
A 40%  B 50%  C 60%  D 80%
55 What is the surface area of the birdhouse?  

![Diagram of a birdhouse with dimensions 5 in. x 6 in. x 8 in., 4 in. x 5 in., and 6 in.]

**A** 264 square inches  
**B** 296 square inches  
**C** 320 square inches  
**D** 344 square inches

56 Which number should be removed from the set 1, 1, 1, 3, 5, 6, and 9 so the mode will be 1, the median 2, and the mean 3.5?  

**A** 3  
**B** 5  
**C** 6  
**D** 9

57 Which answer describes the figure?  

![Figure with blocks]  

**A** The left side is 2 blocks high and the right side is 2 blocks high.  
**B** The left side is 2 blocks high and the right side is 1 block high.  
**C** The left side is 3 blocks high and the right side is 1 block high.  
**D** The left side is 3 blocks high and the right side is 2 blocks high.

58 Which inequality is equivalent to \( x - 12 \leq 17 \)?  

**A** \( x - 17 \geq 12 \)  
**B** \( 17 \leq x - 12 \)  
**C** \( 12 - x \leq 17 \)  
**D** \( 12 \geq x - 17 \)

59 What does \( (6)(4) \div 3 - 1 + \frac{1}{2} \) equal?  

**A** 5  
**B** 8  
**C** 10  
**D** 11
A cylindrical Parmesan cheese container 5 inches tall with radius 1.5 inches holds 8 ounces of cheese. How tall would a similar container of radius 1.5 inches need to be to hold 12 ounces of cheese? 3.03
A 6 inches B 7.5 inches C 10 inches D 12 inches

Simplify 2(x - 1) + 4(x + 5). 5.02
A 6x + 4 B 12x + 24 C 6x + 18 D 24x

Olga asked 50 people to identify their favorite kind of television show. The results are shown in the table. If Olga draws a circle graph for the data, how many degrees should she use to represent the drama sector? 1.01

<table>
<thead>
<tr>
<th>Type of Show</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drama</td>
<td>15</td>
</tr>
<tr>
<td>Comedy</td>
<td>20</td>
</tr>
<tr>
<td>Musical</td>
<td>10</td>
</tr>
<tr>
<td>Quiz</td>
<td>5</td>
</tr>
</tbody>
</table>

A 18 B 90 C 108 D 150

Which is a solution of the inequality 7x - 55 < 8? 5.03
A 13 B 11 C 9 D 4

What is the solution of 8x + 2 < 18? 5.01
A x < 8 B x = \(\frac{5}{2}\) C x > 2 D x < 2

What are 2 polygons called if they are the same shape but different sizes? 3.02
A congruent B similar but not congruent C isometric D reflections of each other
66 The wind speed in Black Mountain is 5 miles per hour. If the wind speed increases 7 miles per hour, what will it be? 1.02
   A 35 miles per hour
   B 19 miles per hour
   C 15 miles per hour
   D 12 miles per hour

67 Which ordered pair is a solution of \( y < \frac{2}{3}x + 1 \)? 5.01
   A (6, 4)
   B (6, 5)
   C (9, 10)
   D (−3, 0)

68 If the mode of a bar graph is 10, then which statement is true? 4.03
   A More bars have height 10 than any other value.
   B The middle bar has height 10.
   C The tallest bar is 10 taller than the shortest bar.
   D There must be 10 bars on the graph.

69 Which expression is equivalent to \( \frac{6x + 9}{12} \)? 5.02
   A \( \frac{2x + 3}{4} \)
   B \( \frac{x}{2} + \frac{9}{2} \)
   C \( 6x + \frac{3}{4} \)
   D \( \frac{2x + 3}{2} \)

70 If 1.5 million people are in a 2 blocks by 2 blocks area of Times Square on New Year’s Eve, approximately what is the density per square block? 70 _______
   A 300,000 people/square block
   B 0.375 million people/square block
   C 2.67 million people/square block
   D 6 million people/square block

71 If the volume of a cylinder is \( 80\pi \) cubic centimeters and the radius is 4 centimeters, what is the height? 2.02
   A 5 centimeters
   B 8 centimeters
   C 10 centimeters
   D 20 centimeters
The expression $0.79x + 0.99y$ gives the cost of $x$ bunches of green onions and $y$ cucumbers. What is the cost of 6 bunches of green onions and 4 cucumbers?  

A $10.28  
B $9.10  
C $8.70  
D $6.92

Rehan had $6.50. He gave $2.95 to Theresa and received $1.26 from Peyton. How much money does Rehan have now?  

A $2.29  
B $4.81  
C $8.19  
D $10.71

The graph shows the number of students who attended a middle school dance. Of the 8th graders who went to the dance, how many fewer were girls than boys?  

A 120  
B 15  
C 10  
D 5

For Questions 75 and 76, use similar triangles $XYZ$ and $PQR$.  

Which statement is true?  

A $m\angle X = m\angle P$  
B $m\angle X = m\angle Y$  
C $m\angle X = m\angle R$  
D $m\angle X > m\angle P$  

If $XZ = \frac{1}{3}PR$, which statement is true?  

A $m\angle X = \frac{1}{3}m\angle P$  
B $PQ = \frac{1}{3}XY$  
C $XY + PQ = \frac{1}{3}$  
D $YZ = \frac{1}{3}QR$
For Questions 77 and 78, Shauna saw a total of 30 clams and fish at the seashore one day.

77 If the number of fish Shauna saw was 6 more than twice the number of clams, which equation could she use to find \( x \), the number of clams? 5.03

- A \( 2x + 6 = 30 \)
- B \( x + 2x + 6 = 30 \)
- C \( x + 6 = 30 \)
- D \( x = 2x + 6 \)

78 How many clams did she see? 5.03

- A 24
- B 16
- C 12
- D 8

For Questions 79 and 80, Yuri surveyed 100 high school seniors about their intended college major. The results are shown in the circle graph.

79 If the mode number changes to 24, which could be the new circle graph? 4.03

- A
- B
- C
- D

80 If the range changes to 25 because of Business, and Liberal Arts stays at 10 percent, then to what percent would Business change? 4.03

- A 15%
- B 25%
- C 35%
- D 45%
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 Develop and use ratios, proportions, and percents to solve problems.

1. Anisha bought a coat that was marked down 20%. The regular price was $120. How much did Anisha pay for the coat before tax?
   A $100
   B $96
   C $80
   D $24

2. The grocery store sells tomato sauce in 8-ounce cans for 64 cents, 12-ounce cans for 84 cents, and 16-ounce cans for $1.20. Which size is the best buy?
   A 8-ounce can
   B 12-ounce can
   C 16-ounce can
   D they all cost the same

3. Jill bought a dozen peaches for $2.88 at a fruit stand in Monroe. How much did she pay for each peach?
   A 12 cents
   B 20 cents
   C 24 cents
   D 32 cents

4. If there are seven girls for every nine boys in a class at West Middle School, how many girls would you expect if there were fifteen boys?
   A $\frac{7}{9}$
   B 10
   C 11\(\frac{2}{3}\)
   D 19\(\frac{2}{7}\)

5. Which proportion is equivalent to $\frac{a}{b} = \frac{c}{d}$?
   A $\frac{a}{c} = \frac{b}{d}$
   B $\frac{a}{d} = \frac{b}{c}$
   C $\frac{a}{c} = \frac{d}{b}$
   D $\frac{a+b}{b} = \frac{c+b}{d}$
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 1.01** (continued)

6 Mrs. Smith has 30 seventh graders in class. Three new students transfer into her class for the second semester. What is the percent of increase in the number of students?
   - A 5%
   - B 10%
   - C 20%
   - D 30%

7 The Biltmore Estate has 250 rooms. Rich’s house has 10 rooms. The number of rooms in Rich’s house is what percent of the number of rooms in the Biltmore Estate?
   - A 4%
   - B 10%
   - C 25%
   - D 40%

8 A recipe that makes 48 cookies calls for $\frac{3}{4}$ cup of brown sugar. Skip wants to make 72 cookies. How much brown sugar should he use?
   - A $\frac{1}{2}$ cup
   - B $\frac{3}{4}$ cup
   - C 1 cup
   - D $1\frac{1}{8}$ cup

9 If sales tax is 4%, how much is the tax on a $15.00 compact disk?
   - A $0.06
   - B $0.60
   - C $2
   - D $6

10 Mr. Perry earns 5% commission on each pair of shoes he sells. His commission for the week was $700. What was the total value of the shoes he sold that week?
   - A $35
   - B $140
   - C $3,500
   - D $14,000
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)

11 A house that was worth $200,000 in 1995 is now worth $250,000. What is the percent of increase?
   - A 10%
   - B 25%
   - C 40%
   - D 50%

12 Rectangle $ABCD$ is similar to rectangle $AEFG$. What is $AD$?
   - A 6.75 centimeters
   - B 11 centimeters
   - C 12 centimeters
   - D 15 centimeters

13 Kris can swim 6 lengths of the pool in 5 minutes. How long will it take her to swim 15 lengths?
   - A 10 minutes
   - B 12.5 minutes
   - C 14 minutes
   - D 18 minutes

14 The Tar Heel Bank pays 2.25% interest on 12-month certificates of deposit. How much interest will a $10,000 certificate earn in 1 year?
   - A $2,250
   - B $444.44
   - C $225
   - D $44.44

15 Cindy’s dog had 6 puppies in her first litter and 10 puppies in her second litter. What was the percent of increase?
   - A $166\frac{2}{3}\%$
   - B $66\frac{2}{3}\%$
   - C 60%
   - D 40%
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)

16 A group of tourists were asked to pick their favorite North Carolina lighthouse. The results are shown in the circle graph. What percent of the tourists chose Cape Lookout lighthouse?

A 13%  
B 23%  
C 47%  
D 77%

Use the following information to answer Questions 17 and 18.

The table shows the results Felton received when he asked 120 children to identify their favorite toy.

<table>
<thead>
<tr>
<th>Favorite Toy</th>
<th>Stuffed Animal</th>
<th>Doll</th>
<th>Truck</th>
<th>Computer Game</th>
<th>Tricycle</th>
<th>Ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>20</td>
<td>24</td>
<td>10</td>
<td>36</td>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

17 What percent of the children said a computer game was their favorite toy?

A 30%  
B 36%  
C 43%  
D 72%

18 Felton made a circle graph for this data. About how many degrees was the sector that represented stuffed animals?

A \(16\frac{2}{3}\)  
B 20  
C 56  
D 60

For Questions 19 and 20, there are 12 boys and 8 girls in the French Club.

19 What is the ratio of boys to girls?

A 2:5  
B 3:5  
C 2:3  
D 3:2

20 What percent of the members of the French Club are girls?

A 8%  
B 40%  
C 60%  
D 75%
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 fluency in addition, subtraction, multiplication, and division of rational numbers.
- Analyze computational strategies.
- Describe the effect of operations on size.
- Estimate the results of computations.
- Judge the reasonableness of solutions.

1 If the temperature in Raleigh is 20 degrees and the temperature in Asheville is −6 degrees, how many degrees colder is it in Asheville than in Raleigh?
   A 26 degrees  
   B 20 degrees  
   C 14 degrees  
   D 6 degrees

2 How does the value of \(\frac{100}{n}\) change as \(n\) increases from 1 to 10?
   A It decreases from 100 to 10.  
   B It increases from 10 to 100.  
   C It decreases from 100 to 1.  
   D It increases from 1 to 10.

3 Which statement is true?
   A \(100 \div \frac{3}{5} > 100\)  
   B \(100 \div \frac{3}{5} < 100\)  
   C \(100 \div \frac{3}{5} = 60\)  
   D \(100 \div \frac{3}{5} > 100 \div \frac{1}{5}\)

4 If it takes Maria and Norm \(\frac{3}{4}\) hours together to rake the leaves in their yard, which number of hours is a reasonable estimate of the time it will take Maria to rake the leaves by herself?
   A \(1\frac{1}{2}\) hours  
   B \(3\frac{1}{4}\) hours  
   C \(6\frac{1}{2}\) hours  
   D \(15\frac{3}{4}\) hours

5 The bakery sells 10 cupcakes for $3.70. How much does one cupcake cost?
   A 3.7 cents  
   B $0.37  
   C $2.70  
   D $37.00

6 Samari rode his motorcycle half way from Lumberton to Wilmington, which are 70 miles apart. How far did he ride his motorcycle?
   A 25 miles  
   B 30 miles  
   C 35 miles  
   D 40 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 1.02 (continued)

7 Which is greatest when \( n = -3 \)?
\[ 2n, \frac{2}{n}, 2 + n, 2 - n \]
A 2n  
B \( \frac{2}{n} \)  
C 2 + n  
D 2 - n

8 If about two-thirds of 148 seventh graders buy their lunch at school, which is a reasonable estimate of the number who buy their lunch?
A 150  
B 100  
C 75  
D 50

9 Which is a reasonable length of time for Trevor to walk to the corner store, 3 blocks from his house?
A 10 minutes  
B 2 hours  
C 15 seconds  
D 1 week

10 The record bluefish caught at Hatteras Inlet in 1972 weighed 31 pounds, 12 ounces. (Hint: one pound equals 16 ounces.) If an average serving of fish is 6 ounces, about how many servings would this fish provide?
A 6  
B 40  
C 62  
D 85

11 Which is greatest when \( n = -10 \)?
\[ -2n, -\frac{2}{n}, -2 + n, -2 - n \]
A \(-2n\)  
B \( -\frac{2}{n} \)  
C \(-2 + n\)  
D \(-2 - n\)

12 Suppose there are 50 eighth graders in one school in Boone. If \( \frac{1}{10} \) of the eighth graders are home with the flu and \( \frac{2}{3} \) of the remaining students are on a field trip, how many are in school?
A 5  
B 15  
C 20  
D 30
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)

13 Vanessa wanted to tip her waitress 15 percent of the price of her dinner. If her dinner cost $11.97, which is a reasonable estimate for the amount of tip that Vanessa should leave?
   A $0.60
   B $1.20
   C $1.50
   D $1.80

14 Francisco has quiz grades of 18, 20, 15, and 16 in his mathematics class. Which is a reasonable estimate of Francisco’s average quiz grade?
   A 20
   B 17
   C 13
   D 9

15 Ericsson Stadium has a capacity of 73,500 people. If every seat was sold for each of the 8 Carolina Panthers home games, how many total tickets were sold during the season?
   A 9,190
   B 44,800
   C 588,000
   D 668,000

16 The Graveyard of the Atlantic exhibit at the North Carolina Aquarium has a 285,000-gallon tank that contains over 450 fish. About how many gallons of water is this per fish?
   A 40 gallons
   B 630 gallons
   C 6,300 gallons
   D 128,250,000 gallons

17 Manuel made the following deposits into his savings account during July: $50, $72, $225, $11.25, $65, $15.75. If the balance in his account was $346 on July 1st, what was the balance on August 1st? Assume he did not withdraw any money from his account during this time.
   A $3,458
   B $785
   C $439
   D $−93
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)

18 The wind chill in High Point is 12°F. What will the wind chill be if it drops 15 degrees?
   A  27°F
   B  3°F
   C  −3°F
   D  −27°F

19 Ruth Ann bought 100 shares of Smoky Mountain Company stock for $30 per share. She sold these shares 3 years later for a total of $3,250. How much was her gain or loss?
   A  gain of $250
   B  loss of $250
   C  gain of $3,250
   D  loss of $3,000

20 A baby weighs 8 pounds when it is born. If it triples its weight by age 2, how much does it weigh at age 2?
   A  11 pounds
   B  16 pounds
   C  24 pounds
   D  32 pounds

21 Ukari bought a DVD for $21.95 and a package of gum for $0.90. She gave the clerk twenty-five dollars. How much change did she receive? Do not include tax.
   A  $22.85
   B  $21.05
   C  $3.15
   D  $2.15

22 Kyle made a blueberry pie. He gave $\frac{1}{4}$ of the pie to his brother, $\frac{1}{4}$ to his father, and $\frac{1}{8}$ to his younger sister. What fraction of the pie was left?
   A  $\frac{1}{2}$
   B  $\frac{3}{8}$
   C  $\frac{1}{4}$
   D  $\frac{1}{8}$
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.

**OBJECTIVE 1.03** Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

Use the following information to answer Questions 1–3.

You asked 20 classmates whether they would attend a concert if the price of a ticket were set at various amounts. The results are shown in the table.

<table>
<thead>
<tr>
<th>Number of People Who Would Attend Concert</th>
<th>Ticket Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>$10.00</td>
</tr>
<tr>
<td>12</td>
<td>$15.00</td>
</tr>
<tr>
<td>8</td>
<td>$20.00</td>
</tr>
<tr>
<td>6</td>
<td>$25.00</td>
</tr>
</tbody>
</table>

1. Where should the ticket price be set in order to generate the most income?
   - A $10.00
   - B $15.00
   - C $20.00
   - D $25.00

2. How much will the maximum income be?
   - A $150
   - B $160
   - C $180
   - D $200

3. If these 20 classmates are representative of all 500 students in your school, about how many students would attend the concert if the tickets cost $15.00?
   - A 300
   - B 250
   - C 200
   - D 120

4. In 2003, Carleton received a collection of 1,024 baseball cards from his father. Each year his father had doubled the number of cards. How many years ago did his father buy the first card?
   - A 10
   - B 16
   - C 24
   - D 64

5. Kihoon’s alarm clock went off at 6:10 A.M. but he did not get up. After that the snooze alarm went off every 5 minutes. If Kihoon got up at 6:56 A.M., how many times did the snooze alarm buzz?
   - A 7
   - B 8
   - C 9
   - D 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 1.03 (continued)

6 Katie bought 5 windsocks for $14.99 each at a Kitty Hawk store. Estimate the total cost without tax.
   A $60  B $75
   C $90  D $105

7 Suppose you have $1,000 in a savings account. If the bank pays 3% interest, how much interest will your money earn in 3 years? Use
   interest = principle × rate × time.
   A $300  B $90
   C $30   D $27

8 If a triangle is chosen at random from the triangles shown, what is the probability that it will be acute?
   A \( \frac{1}{6} \)  B \( \frac{1}{4} \)
   C \( \frac{1}{2} \)  D \( \frac{3}{4} \)

9 If dog food for Jake costs about $10 a month, about how much will it cost to feed him for 15 years?
   A $120  B $150
   C $1,500 D $1,800

10 Maria bought the items shown in the table at the grocery store. About how much was the total bill before tax?

<table>
<thead>
<tr>
<th>Grocery Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>$2.89</td>
</tr>
<tr>
<td>Bread</td>
<td>$2.07</td>
</tr>
<tr>
<td>Hamburger</td>
<td>$4.56</td>
</tr>
<tr>
<td>Lettuce</td>
<td>$1.09</td>
</tr>
<tr>
<td>Cheese</td>
<td>$2.43</td>
</tr>
<tr>
<td>Oranges</td>
<td>$1.93</td>
</tr>
</tbody>
</table>

   A $12  B $15
   C $17  D $19
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 Ian was delivering a truckload of 26,000 pounds of grape jelly to Norfolk. He drove from Chattanooga to Cherokee, a distance of 149 miles, in 3 hours. What was his approximate speed in miles per hour?
   A 60 miles per hour
   B 58 miles per hour
   C 50 miles per hour
   D 45 miles per hour

12 Fifteen seventh graders went hiking. Ten saw a falcon and 8 saw a deer. Which of the Venn diagrams would help determine how many saw both a falcon and a deer?
   A
   B
   C
   D

13 What is the cost of a skateboard if it is marked down $9\frac{1}{2}\%$ from its original price of $56$?
   A $61.88$
   B $53.20$
   C $50.68$
   D $5.32$

14 What is $33\frac{1}{3}\%$ of 18?
   A 59
   B 24
   C 12
   D 6

15 What is the percent of change from 16 inches to 20 inches?
   A 20\%
   B 25\%
   C 40\%
   D 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 1.03 (continued)

16 Meryl bought a $48 sweater at Sell-Right Department Store for 10% off. Jeannie bought the same sweater at Berry Discount Store for $42.95. Who paid less for the sweater and how much less?
A Jeannie paid 97 cents less than Meryl.
B Meryl paid 95 cents less than Jeannie.
C Meryl paid 25 cents less than Jeannie.
D Jeannie paid 25 cents less than Meryl.

Use the following information to answer Questions 17–20.

The students in Mrs. Brown’s mathematics class took a pretest and a posttest for Chapter 1. The results for 5 students are shown in the table.

<table>
<thead>
<tr>
<th>Student</th>
<th>April</th>
<th>Belinda</th>
<th>Chris</th>
<th>David</th>
<th>Eugene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Score</td>
<td>16</td>
<td>15</td>
<td>10</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Posttest Score</td>
<td>18</td>
<td>18</td>
<td>12</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

17 Which student had the greatest percent of increase from the pretest to the posttest?
A April
B Chris
C David
D Eugene

18 Which two students had the same percent of increase from the pretest to the posttest?
A April and Belinda
B Belinda and Eugene
C Chris and Eugene
D Belinda and Chris

19 If another student, Frank, had a pretest score of 6, what must his posttest score be for his percent of increase to be 50 percent?
A 3
B 8
C 9
D 12

20 If another student, Gina, had a posttest score of 18, what was her pretest score for her percent of decrease to be 10 percent?
A 12
B 16
C 18
D 20

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Standards Practice

**OBJECTIVE 2.01** Draw objects to scale and use scale drawings to solve problems.

1. Rocky Mount and Fayetteville are $\frac{5}{4}$ inches apart on a map. If the scale of the map is $\frac{1}{2}$ inch $= 9$ miles, about how many miles apart are these 2 cities?
   
   - (A) 80
   - (B) 90
   - (C) 95
   - (D) 100

2. A miniature model of the Dean Smith Center is $9\frac{1}{2}$ inches long. If the scale is 1 inch $= 40$ feet, about how long is the real arena?
   
   - (A) 4,550 feet
   - (B) 380 feet
   - (C) 225 feet
   - (D) 60 feet

3. Which ratio expresses the ratio 2 inches:100 miles in simplest form?
   
   - (A) $1:3,168,000$
   - (B) $1:264,000$
   - (C) $1:600$
   - (D) $1:50$

4. Which ratio expresses the ratio 4 cups:1 gallon in simplest form?
   
   - (A) $4:1$
   - (B) $1:2$
   - (C) $1:4$
   - (D) $1:8$

5. A scale model of a car is 3 inches long. The real car is 12 feet long. What is the scale for the model?
   
   - (A) $1:144$
   - (B) $1:48$
   - (C) $1:12$
   - (D) $1:4$

6. Find the scale factor for these two similar rectangles.

   ![Diagram of rectangles]

   - (A) $1:2$
   - (B) $1:4$
   - (C) $1:6$
   - (D) $1:8$
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.

**OBJECTIVE 2.01**

7 A picture 3 inches wide and 5 inches long is to be enlarged so the new width will be 8 inches. What will be the length of the enlargement?

A 1\(\frac{7}{8}\) inches  
B 10 inches  
C 12 inches  
D 13\(\frac{1}{3}\) inches

8 Charlene is drawing a house with a scale of \(\frac{1}{4}\) inch = 1 foot. If the dining room on the drawing is 2\(\frac{1}{2}\) inches by 3\(\frac{3}{4}\) inches, what are the actual dimensions of the dining room?

A 15 feet by 18 feet  
B 2\(\frac{1}{2}\) feet by 3\(\frac{3}{4}\) feet  
C 5 feet by 8 feet  
D 10 feet by 15 feet

9 How many feet per second are equivalent to 50 miles per hour?

A 4,400  
B 220  
C 73\(\frac{1}{3}\)  
D 0.14

10 How many meters per minute are equivalent to 6 centimeters per second?

A 3.6  
B 10  
C 36  
D 216

11 A plastic model of the U.S.S. North Carolina Battleship is available online for $14.95. If the scale is 1:570 and the real battleship is 728 feet long, about how long is the model? Round your answer to the nearest tenth of an inch.

A 1.3 inches  
B 10.2 inches  
C 15.3 inches  
D 19.1 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 2.01 (continued)

12 How long will the image of $AB$ be under a dilation of scale factor $\frac{3}{2}$?

A 4 inches  
B 9 inches  
C 12 inches  
D 15 inches

13 Which of these is an enlargement? In each case the preimage is shown on the left and the image on the right.

A  
B  
C  
D

14 Sydna made a scale drawing of a painting in the Mint Museum of Art that is 2 feet by 3 feet. She used a scale factor of $\frac{1}{6}$. What are the dimensions of her drawing?

A $\frac{1}{3}$ inches by $\frac{1}{2}$ inches  
B 12 inches by 18 inches  
C 8 inches by 12 inches  
D 4 inches by 6 inches

15 Leigh is planning a circular flower garden. She made a scale drawing of the garden. Her garden will have a radius of 8 feet. If the scale factor is $\frac{1}{16}$, what is the radius of her garden on her drawing?

A $\frac{1}{2}$ inches  
B 2 inches  
C 4 inches  
D 6 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 What is the length of the image of \( ST \) if \( ST = 10 \) meters and the scale factor is \( \frac{3}{5} \)?
- A 2 meters
- B 4 meters
- C 6 meters
- D 8 meters

17 What is the length of \( PQ \) if its image has length 24 centimeters under a dilation of scale factor \( \frac{3}{4} \)?
- A 15 centimeters
- B 18 centimeters
- C 32 centimeters
- D 40 centimeters

18 Luther scanned a picture of the Bell Tower that is 400 pixels wide and 600 pixels long. He resized it so it is 500 pixels wide. What scale factor did he use?
- A \( \frac{4}{5} \)
- B \( \frac{5}{6} \)
- C \( \frac{6}{5} \)
- D \( \frac{5}{4} \)

19 \( \triangle A'B'C' \) is the image of \( \triangle ABC \) under a dilation. What is the scale factor?
- A \( \frac{2}{1} \)
- B \( \frac{1}{2} \)
- C \( \frac{1}{3} \)
- D \( \frac{1}{4} \)

20 What are the coordinates of the image of \( X(-2, 3) \) under a dilation of scale factor \( 4 \frac{1}{2} \)?
- A \((-9, 13.5)\)
- B \(\left(2\frac{1}{2}, 7\frac{1}{2}\right)\)
- C \((-6.5, -1.5)\)
- D \(\left(-\frac{4}{9}, \frac{2}{3}\right)\)
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 volume and surface area of cylinders, prisms, and composite shapes.

1 If a book that weighs 16 ounces has a volume of 180 cubic inches, what is the approximate density of the book? Round your answer to 2 decimal places.
   A 0.09 ounce/cubic inch
   B 1.07 cubic inches/ounce
   C 11.25 cubic inches/ounce
   D 2,880 ounces/cubic inch

2 A can of beans has a volume of 15.7 cubic inches. If its density is 0.6 ounce/cubic inch, about how much does it weigh? Round your answer to 1 decimal place.
   A 0.1 ounce
   B 4.1 ounces
   C 9.4 ounces
   D 26.2 ounces

For Questions 3 and 4, use a cylindrical can that has a radius of 3.3 centimeters and a height of 10 centimeters. Use 3.14 for \( \pi \).

3 What is the volume of the can? Round your answer to 1 decimal place.
   A 103.6 cubic centimeters
   B 108.9 cubic centimeters
   C 342.1 cubic centimeters
   D 412.4 cubic centimeters

4 What is the surface area of the can? Round your answer to 1 decimal place.
   A 412.4 square centimeters
   B 275.8 square centimeters
   C 207.2 square centimeters
   D 103.6 square centimeters

5 Which is a face of the box?

   A \( \angle EHD \)
   B \( \triangle FCH \)
   C \( BC \)
   D \( ABFE \)
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)

For Questions 6 and 7, use a cereal box that is 12 inches high, 3 inches deep, and 8 inches wide.

6 What is the volume of the cereal box?  
A 156 cubic inches  
B 288 cubic inches  
C 312 cubic inches  
D 529 cubic inches

7 The nutritional value information takes up 8 square inches and the name information takes up 48 square inches on the box. How much surface area is left for puzzles and other information?  
A 56 square inches  
B 232 square inches  
C 256 square inches  
D 312 square inches

For Questions 8 and 9, use the triangular prism below.

8 Which is a base of the prism?  
A \( \triangle STU \)  
B \( \triangle TUP \)  
C \( \square PRUS \)  
D SR

9 What is the lateral area of the prism?  
A 36 square centimeters  
B 180 square centimeters  
C 216 square centimeters  
D 360 square centimeters

10 Ernie is piecing together 9-inch squares to make a quilt. He wants the quilt to be 90 inches wide and 108 inches long. How many squares does he need?  
A 22  
B 120  
C 810  
D 1,080
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)

For Questions 11 and 12, use the right triangular prism.

11 What is the volume of the prism?
   A  7,800 cubic millimeters  B  600 cubic millimeters
   C  360 cubic millimeters      D  300 cubic millimeters

12 What is the surface area of the prism?
   A  7,800 square millimeters  B  600 square millimeters
   C  360 square millimeters      D  300 square millimeters

Use the following information to answer Questions 13 and 14.
Mr. Stuart was washing clothes when the washing machine quit working. The cylindrical tub had 8 inches of water left in it when the machine stopped. The tub has a diameter of 24 inches.

13 About how many cubic inches of water were left in the washing machine tub?
   A  14,469 cubic inches  B  3,619 cubic inches
   C  1,206 cubic inches      D  603 cubic inches

14 Mr. Stuart had a plastic rectangular container 3 inches by 4 inches by 6 inches to use to bail the water out of the broken washing machine. About how many times would he need to fill this container to empty the water out of the tub? Round your answer to the nearest ten.
   A  200  B  100
   C  50      D  10

15 How deep is a rectangular pool that is 24 feet long and 15 feet wide, and has a volume of 1,620 cubic feet?
   A  3 feet  B  4.5 feet
   C  6 feet      D  8 feet
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)

Use the following information to answer Questions 16 and 17.

An aquarium on Roanoke Island is shaped like a square prism. It is 17 feet deep and 90 feet on each side.

16 What is the volume of the aquarium?
   A 137,700 cubic feet
   B 68,850 cubic feet
   C 4,804 cubic feet
   D 1,530 cubic feet

17 If the volume of 1 gallon of water is about 0.13 cubic feet, approximately how many gallons of water does this aquarium hold?
   A 11,769 gallons
   B 17,900 gallons
   C 529,615 gallons
   D 1,059,231 gallons

Use the following information to answer Questions 18 and 19.

Juan’s bedroom is 12 feet by 15 feet. The ceiling is 8 feet high.

18 What is the total area of the 2 walls of the room that have no windows or doors, and the ceiling?
   A 35 square feet
   B 216 square feet
   C 396 square feet
   D 1,440 square feet

19 If 1 gallon of paint costs $12.99 and covers 300 square feet, how much will it cost Juan to put 2 coats of paint on those 2 walls and ceiling of his room? No partial cans of paint may be purchased. Do not include tax.
   A $77.94
   B $51.96
   C $38.97
   D $25.98
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** Using three-dimensional figures:
- Identify, describe, and draw from various views (top, side, front, corner).
- Build from various views.
- Describe cross-sectional views.

1. What is the volume of the cube if each small cube has a volume of 1 cubic unit?
   - A 3 cubic units
   - B 9 cubic units
   - C 27 cubic units
   - D 81 cubic units

2. What is the name of the figure?
   - A prism
   - B cylinder
   - C cone
   - D pyramid

3. What is the name of the figure?
   - A sphere
   - B cylinder
   - C cone
   - D prism

4. Which solid has all congruent faces?
   - 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 3.01 (continued)

5 How many faces does a tetrahedron have?  
A 2  B 4  
C 5  D 6

6 Which figure will be formed by the net shown?  
A triangular prism  
B triangular pyramid  
C tetrahedron  
D cone

7 Which figure will be formed by the net shown?  
A tetrahedron  
B triangular pyramid  
C square pyramid  
D square prism

8 A cross-section of a cone where the intersecting plane is perpendicular to the cone’s height can be what kind of figure?  
A square  
B triangle  
C line  
D circle

9 A cross-section of a square prism where the intersecting plane is parallel to the base will be what kind of figure?  
A square  
B rectangle  
C circle  
D line

10 Which describes all cross-sections of a square pyramid where the intersecting plane is parallel to the base?  
A congruent squares  
B parallel triangles  
C perpendicular squares  
D noncongruent squares
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)

11. The intersection of the cylinder and which other figure shown is a cross-section perpendicular to the base of the cylinder?
   - A $\overline{AB}$
   - B $\overline{EF}$
   - C plane $D$
   - D plane $C$

12. Which figure is a net of a triangular pyramid?
   - A
   - B
   - C
   - D

13. The shape shown at the right is the top view of which figure?
   - 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 3.01 (continued)

14 Which is the top view of the figure?

A
B
C
D

15 Which could be a top view of the figure?

A
B
C
D

16 Which could be a front view of the figure?

A
B
C
D

For Questions 15 and 16, use the side view of the figure.

side view

15
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 3.02** Identify, define, and describe similar and congruent polygons with respect to angle measures, length of sides, and proportionality of sides.

1. Which is a true statement about congruent polygons?
   - A Both corresponding sides and corresponding angles are proportional.
   - B Both corresponding sides and corresponding angles are congruent.
   - C Corresponding angles are proportional and corresponding sides are congruent.
   - D Corresponding angles are congruent and corresponding sides are proportional.

2. Which is the best statement about similar polygons?
   - A Both corresponding sides and corresponding angles are proportional.
   - B Both corresponding sides and corresponding angles are congruent.
   - C Corresponding angles are proportional and corresponding sides are congruent.
   - D Corresponding angles are congruent and corresponding sides are proportional.

3. Which statement is true about the figure?
   - A \( \triangle GHK \) is the image of \( \triangle MLK \) under a reflection.
   - B \( m\angle G = 2m\angle M \)
   - C \( \triangle GHK \) is similar to \( \triangle MLK \).
   - D \( \triangle GHK \) is congruent to \( \triangle MLK \).
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)**

4 Which pair of rectangles are similar?

A  $ABCD$ and $EFGH$  
B  $EFGH$ and $NOPQ$  
C  $ABCD$ and $NOPQ$  
D  $EFGH$ and $JKLM$

Use the following information to answer Questions 5 and 6.

$WXYZ$ is congruent to $PQRS$, $YZ = 6$ centimeters, and $m \angle W = 42$.

5 What is the length of $QR$?

A  6 centimeters  
B  12 centimeters  
C  36 centimeters  
D  cannot be determined

6 Which other angle has measure 42?

A  $\angle X$  
B  $\angle Z$  
C  $\angle R$  
D  $\angle S$

Use the following information to answer Questions 7 and 8.

$MNOP$ is similar to $TUVW$ and $m \angle M = 17$.

7 What is $m \angle T$?

A  $8\frac{1}{2}$  
B  17  
C  34  
D  cannot be determined

8 If $\frac{MN}{TU} = \frac{1}{3}$, what does $\frac{OP}{WW}$ equal?

A  $\frac{1}{9}$  
B  $\frac{1}{6}$  
C  $\frac{1}{3}$  
D  $\frac{1}{2}$
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 3.02 (continued)

9 What is true about the 2 figures shown?
   A They are congruent.
   B They are similar.
   C They are both congruent and similar.
   D They are neither congruent nor similar.

10 Which statement is true about the triangles?
   A \( \triangle XYZ \cong \triangle WUV \)
   B \( \triangle XYZ \cong \triangle VWU \)
   C \( \triangle XYZ \cong \triangle UVW \)
   D \( \triangle XYZ \sim \triangle UVW \)

11 Which polygon is similar to the one at the right?
   A
   B
   C
   D

12 Which polygon is congruent to the one at the right?
   A
   B
   C
   D
OBJECTIVE 3.02  (continued)

13 Marty said that 2 congruent polygons were polygons with the same number of sides, Antoine said the sides had to all be congruent, and Olivia said the corresponding sides and corresponding angles had to be congruent. Who was correct?
   A Marty
   B Antoine
   C Olivia
   D Both Antoine and Olivia

14 If \( ABCDE \sim FGHIJ \), then which statement is true?
   A \( m\angle A = m\angle F \)
   B \( m\angle A = 2m\angle F \)
   C \( m\angle A = \frac{1}{2}m\angle F \)
   D \( m\angle A = m\angle J \)

15 In \( \triangle XYZ \) and \( \triangle PQR \), \( \angle X \equiv \angle P \), \( \angle Y \equiv \angle Q \), \( \angle Z \equiv \angle R \), \( XY = 8 \) feet, \( YZ = 6 \) feet, \( XZ = 12 \) feet, \( PQ = 4 \) feet, \( QR = 3 \) feet, and \( PR = 6 \) feet. Which statement is true?
   A \( \triangle XYZ \equiv \triangle PQR \)
   B \( \triangle XYZ \sim \triangle PQR \)
   C \( \triangle XYZ \) is both congruent and similar to \( \triangle PQR \).
   D \( \triangle XYZ \) is neither congruent nor similar to \( \triangle PQR \).

16 In \( \triangle ABC \) and \( \triangle GHI \), \( m\angle A = 30 \), \( m\angle B = 60 \), \( m\angle C = 90 \), \( m\angle G = 30 \), \( m\angle H = 60 \), \( m\angle I = 90 \), \( AB = GH \), \( BC = HI \), \( AC = GI \). Which statement is true?
   A The triangles are congruent but not similar.
   B The triangles are similar but not congruent.
   C The triangles are congruent and similar.
   D The triangles are neither congruent nor similar.

17 If \( ABCDE \cong FGHIJ \), which must be true?
   A \( BC = GH \)
   B \( BC = CD \)
   C \( m\angle B + m\angle G = 180 \)
   D \( m\angle C + m\angle H = 90 \)
Standards Practice

**OBJECTIVE 3.03** Use scaling and proportional reasoning to solve problems related to similar and congruent polygons.

*Use the following information to answer Questions 1–3.*

\( \triangle ABC \) is similar to \( \triangle DEF \).

1. What is the measure of \( \angle F \)?
   - A 80°
   - B 60°
   - C 30°
   - D 20°

2. What is the length of \( DF \)?
   - A 8 centimeters
   - B 6 centimeters
   - C 4 centimeters
   - D 1.5 centimeters

3. What is the scale factor?
   - A \( \frac{5}{3} \)
   - B \( \frac{5}{4} \)
   - C \( \frac{3}{4} \)
   - D \( \frac{1}{2} \)

4. If \( \triangle XYZ \equiv \triangle WVT \), \( XY \) is congruent to what segment?
   - A \( \angle X \)
   - B \( \overline{WT} \)
   - C \( \overline{VT} \)
   - D \( \overline{WV} \)

5. If \( \triangle XYZ \equiv \triangle WVT \), \( \angle Z \) is congruent to what angle?
   - A \( \angle T \)
   - B \( \angle V \)
   - C \( \angle W \)
   - D \( \angle Y \)
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)

6 If the ratio of corresponding sides of two similar triangles is \( \frac{3}{4} \), what is the ratio of the perimeters of the triangles?

A \( \frac{9}{4} \)  
B \( \frac{1}{1} \)  
C \( \frac{13}{16} \)  
D \( \frac{3}{4} \)

Use the following information to answer Questions 7–9.

Pentagon \( \text{GHIJK} \) is similar to pentagon \( \text{LMNOP} \).

7 What is the scale factor?

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

8 If \( m\angle N = 108 \), what is \( m\angle K \)?

A 54  
B 108  
C 180  
D 216

9 What is the ratio of the perimeter of pentagon \( \text{GHIJK} \) to the perimeter of pentagon \( \text{LMNOP} \)?

A \( \frac{6}{1} \)  
B \( \frac{4}{1} \)  
C \( \frac{2}{1} \)  
D \( \frac{5}{6} \)

10 If the ratio of corresponding sides of two similar triangles is \( \frac{3}{4} \), what is the ratio of the areas of the triangles?

A \( \frac{9}{4} \)  
B \( \frac{1}{1} \)  
C \( \frac{3}{4} \)  
D \( \frac{9}{16} \)
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 3.03 (continued)

11 A tree 50 feet tall casts a shadow 30 feet long. Mary’s shadow is 27 inches long. How tall is Mary?

A 45 inches  
B 48 inches  
C 50 inches  
D 56 inches

12 A reprint of a picture in a photographic exhibit is 8 inches wide and 12 inches long. If the actual picture is 60 inches long, how wide is it?

A 32 inches  
B 40 inches  
C 56 inches  
D 90 inches

13 $AB$ is the image of $DE$ under a dilation of magnitude $\frac{1}{4}$. If $DE = 12$ centimeters, how long is $AB$?

A 48 centimeters  
B 24 centimeters  
C 4 centimeters  
D 3 centimeters

14 Two cubes are similar. If the length of each side of the lesser cube is 5 centimeters and the scale factor is $\frac{2}{5}$, what is the length of each side of the greater cube?

A 12.5 centimeters  
B 10 centimeters  
C 8 centimeters  
D 2 centimeters

15 Ali made a presentation in her geography class. She brought a model of Linville Falls. The upper falls drop 50 feet and the lower falls drop 60 feet. If the upper falls on her model drop $2\frac{1}{2}$ inches, how many inches should the lower falls drop on her model?

A 2 inches  
B 3 inches  
C 6 inches  
D 8 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 (continued)

Use the following information to answer Questions 16 and 17.

\( \triangle ABC \) is similar to \( \triangle XYZ \).

16 What is the length of \( XY \)?
   - A 8 centimeters
   - B 9 centimeters
   - C 10 centimeters
   - D 12 centimeters

17 What is the length of \( AC \)?
   - A 3 centimeters
   - B 5.5 centimeters
   - C 7 centimeters
   - D 22 centimeters

18 Pierre collects miniatures. He has a miniature television set which is \( \frac{1}{2} \) inch high. If it is a model of a television that is 24 inches high, what is the scale?
   - A 1:48
   - B 1:24
   - C 1:12
   - D 1:6

19 A capital T is about 11 millimeters tall in computer font size 48. About how tall should a capital T be in font size 72?
   - A 14 millimeters
   - B 17 millimeters
   - C 22 millimeters
   - D 33 millimeters

20 A classic replica model of a 1932 car is \( 5 \frac{1}{2} \) inches long. The scale is 1:32. How long was the real car?
   - A 13 feet 4 inches
   - B 14 feet 8 inches
   - C 16 feet
   - D 17.5 feet
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** Collect, organize, analyze, and display data (including box plots and histograms) to solve problems.

For Questions 1–3, use the table of average wind speeds in 6 cities through 2000.

<table>
<thead>
<tr>
<th>City</th>
<th>Average Wind Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Hatteras</td>
<td>10.9 miles per hour</td>
</tr>
<tr>
<td>Chicago</td>
<td>10.4 miles per hour</td>
</tr>
<tr>
<td>Honolulu</td>
<td>11.3 miles per hour</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>6.0 miles per hour</td>
</tr>
<tr>
<td>New York City</td>
<td>9.3 miles per hour</td>
</tr>
<tr>
<td>San Francisco</td>
<td>8.7 miles per hour</td>
</tr>
</tbody>
</table>

1 Which graph illustrates this data? (CH = Cape Hatteras, C = Chicago, H = Honolulu, LA = Los Angeles, NY = New York City, SF = San Francisco.)

A

B

C

D

2 The average wind speed in Cape Hatteras is how many more miles per hour than the average wind speed in San Francisco?

A 0.5 miles per hour  
B 1.6 miles per hour  
C 2.2 miles per hour  
D 4.9 miles per hour

3 What is the median of the average wind speeds of these 6 cities?

A 9.85 miles per hour  
B 9.43 miles per hour  
C 8.65 miles per hour  
D 5.3 miles per hour
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)

For Questions 4–6, use the graph.

(UI = University of Illinois, UW = University of Wisconsin, PSU = Pennsylvania State University, NCSU = North Carolina State University, VT = Virginia Tech.)

4 What is the mean number of volumes in the libraries at these 6 schools?  
A 7,500,000  
C 5,500,000
B 6,000,000  
D 5,000,000

5 About how many more volumes does the Duke University library have than the North Carolina State University library?  
A 2,000  
C 200,000
B 20,000  
D 2,000,000

6 The number of volumes in the Penn State University library is about what percent of the number of volumes in the library at the University of Wisconsin?  
A 75%  
C 50%
B 60%  
D 45%

For Questions 7–9, use the table of test scores.

<table>
<thead>
<tr>
<th>Test Score Interval</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>91–100</td>
<td>⬤‗‗‗‗‗</td>
</tr>
<tr>
<td>81–90</td>
<td>⬤‗‗‖‗‗</td>
</tr>
<tr>
<td>71–80</td>
<td>⬤‗‗‖‗‗‗‖‗</td>
</tr>
<tr>
<td>61–70</td>
<td>‖‗‗‗‗‗‗</td>
</tr>
<tr>
<td>51–60</td>
<td>‖‗‗‗‗‗</td>
</tr>
</tbody>
</table>

7 What percent of the students had scores from 71 to 80?  
A 6%  
C 24%
B 20%  
D 25%

8 In what interval is the median score?  
A 91–100  
C 71–80
B 81–90  
D 61–70

9 The most scores were in which interval?  
A 91–100  
C 71–80
B 81–90  
D 51–60
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)

For Questions 10–11, use the bar graph showing the number of births by month last year in a North Carolina hospital.

10 How many more babies were born in September than in December?
   A 5  B 10  C 15  D 35  

11 In what 3 consecutive months were there the most births?
   A December, January, and February
   B August, September, and October
   C February, March, and April
   D July, August, and September

12 Nadia collects china plates. She has 50 plates decorated as listed in the table. Which circle graph shows this data? (B = Birds, F = Flowers, S = Scenery, C = Cities, MS = Movie Stars.)

<table>
<thead>
<tr>
<th>Plate Decoration</th>
<th>Number of Plates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td>10</td>
</tr>
<tr>
<td>Flowers</td>
<td>6</td>
</tr>
<tr>
<td>Scenery</td>
<td>12</td>
</tr>
<tr>
<td>Cities</td>
<td>5</td>
</tr>
<tr>
<td>Movie Stars</td>
<td>17</td>
</tr>
</tbody>
</table>

   A
   B
   C
   D

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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)

For Questions 13–17, use the box-and-whisker plots.

Prices of CD Burners and Digital Cameras

13 Which is true about the interquartile ranges (IQR)?
   A The IQR for CD burners is 130 and for digital cameras 200.
   B The IQR for CD burners is 250 and for digital cameras 600.
   C The IQR for CD burners is 170 less than that for digital cameras.
   D The IQR for CD burners is 200 less than that for digital cameras.

14 About what percent of digital cameras cost from $400 to $600?
   A 25%
   B 50%
   C 75%
   D 200%

15 How much does the least expensive CD burner cost?
   A $80
   B $100
   C $120
   D $400

16 An outlier for the price of CD burners would be greater than what number?
   A $445
   B $395
   C $380
   D $250

17 If 50 digital cameras were included in this survey, about how many of them cost from $300 to $600?
   A about 13
   B 25
   C about 37
   D 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 4.02 Calculate, use, and interpret the mean, median, mode, range, frequency distribution, and inter-quartile range for a set of data.

For Questions 1–7, use the following data of the depths of shipwrecks off the North Carolina coast, in feet: 25, 20, 20, 20, 65, 30, 85, 100, 90, 120.

1 What is the median depth of these shipwrecks?
A 20 feet  
C 57.5 feet
B 47.5 feet  
D 70 feet

2 What is the mean depth of these shipwrecks?
A 20 feet  
C 57.5 feet
B 47.5 feet  
D 70 feet

3 What is the mode of the depths of these shipwrecks?
A 20 feet  
C 57.5 feet
B 47.5 feet  
D 70 feet

4 What is the upper quartile of the depths of these shipwrecks?
A 47.5 feet  
C 70 feet
B 57.5 feet  
D 90 feet

5 What is the lower quartile of the depths of these shipwrecks?
A 20 feet  
C 57.5 feet
B 47.5 feet  
D 90 feet

6 What is the interquartile range of the depths of these shipwrecks?
A 47.5 feet  
C 70 feet
B 57.5 feet  
D 90 feet

7 What is the range of the depths of these shipwrecks?
A 100 feet  
C 70 feet
B 95 feet  
D 65 feet
OBJECTIVE 4.02 (continued)

For Questions 8–12, use the histogram showing the distance that students walk to school.

8 How many students are represented on the histogram?  
A 5 students  
B 14 students  
C 25 students  
D 40 students

9 What is the median interval for the number of blocks that students walk to school?  
A 0–2 blocks  
B 3–5 blocks  
C 6–8 blocks  
D 9–11 blocks

10 Most students walked how many blocks to school?  
A 3–5 blocks  
B 6–8 blocks  
C 9–11 blocks  
D 12–14 blocks

11 In what interval is the lower quartile?  
A 0–2 blocks  
B 3–5 blocks  
C 6–8 blocks  
D 9–11 blocks

12 If 4 students live less than 2 blocks from school, how many live 2 blocks away?  
A 2 students  
B 6 students  
C 8 students  
D 14 students
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 13–18.**

The stem-and-leaf plot shows the number of seventh graders who were out sick during 18 scheduled school days in 1 month.

<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>1</td>
<td>2 3 5 7 8</td>
</tr>
<tr>
<td>2</td>
<td>1 1 4 6 6 6 7 9</td>
</tr>
<tr>
<td>3</td>
<td>0 0 1 2</td>
</tr>
<tr>
<td>3</td>
<td>1 = 31 students</td>
</tr>
</tbody>
</table>

13. What is the mean?
   - A. 22.6
   - B. 25
   - C. 26
   - D. 29

14. What is the mode?
   - A. 22.6
   - B. 25
   - C. 26
   - D. 29

15. What is the median?
   - A. 22.6
   - B. 25
   - C. 26
   - D. 29

16. What is the range?
   - A. 12
   - B. 17
   - C. 23
   - D. 29

17. What is the lower quartile?
   - A. 12
   - B. 17
   - C. 23
   - D. 29

18. What is the upper quartile?
   - A. 12
   - B. 17
   - C. 23
   - D. 29
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)

For Questions 19–23, use the table of lighthouse heights.

<table>
<thead>
<tr>
<th>Lighthouse</th>
<th>Height (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currituck</td>
<td>162</td>
</tr>
<tr>
<td>Bodie Island</td>
<td>165</td>
</tr>
<tr>
<td>Ocracoke</td>
<td>65</td>
</tr>
<tr>
<td>Cape Hatteras</td>
<td>193</td>
</tr>
<tr>
<td>Cape Lookout</td>
<td>165</td>
</tr>
</tbody>
</table>

19 What is the mode?  
- A 165 feet  
- B 150 feet  
- C 128 feet  
- D 65.5 feet

20 What is the mean?  
- A 165 feet  
- B 150 feet  
- C 128 feet  
- D 65.5 feet

21 What is the median?  
- A 165 feet  
- B 150 feet  
- C 128 feet  
- D 65.5 feet

22 What is the range?  
- A 165 feet  
- B 150 feet  
- C 128 feet  
- D 65.5 feet

23 What is the interquartile range?  
- A 165 feet  
- B 150 feet  
- C 128 feet  
- D 65.5 feet
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** Describe how the mean, median, mode, range, frequency distribution, and inter-quartile range of a set of data affect its graph.

Use the following information to answer Questions 1–4.

The bar graph shows the number of patients seen by 4 doctors on a given day.

![Bar Graph of Number of Patients Seen by Doctors](image)

1. Which would change the mode from 6 to 4?
   - A Dr. Srinivasan saw 6 patients instead of 8.
   - B Dr. Goldman saw 6 patients instead of 4.
   - C Dr. Abu saw 4 patients instead of 6.
   - D Dr. Lopez saw 8 patients instead of 6.

2. Which would change the mean from 6 to 7?
   - A Dr. Lopez saw 8 patients instead of 6.
   - B Dr. Goldman saw 6 patients instead of 4.
   - C Dr. Srinivasan saw 4 patients instead of 6.
   - D Dr. Goldman saw 8 patients instead of 4.

3. Which would change the median from 6 to 7?
   - A Dr. Lopez saw 8 patients instead of 6.
   - B Dr. Goldman saw 6 patients instead of 4.
   - C Dr. Abu saw 4 patients instead of 6.
   - D Dr. Srinivasan saw 10 patients instead of 8.

4. Which would change the range from 4 to 6?
   - A Dr. Lopez saw 8 patients instead of 6.
   - B Dr. Abu saw 8 patients instead of 6.
   - C Dr. Goldman saw 6 patients instead of 4.
   - D Dr. Srinivasan saw 10 patients instead of 8.
OBJECTIVE 4.03 (continued)

Use the following information to answer Questions 5–8.

The line graph shows 10 years of August precipitation in Albemarle.

5 What is the approximate mean?  
   A 3.8 inches  
   B 4.5 inches  
   C 5.0 inches  
   D 5.2 inches

6 If year 6 experiences 4 inches of precipitation, then which statement is true?  
   A Only the median will change.  
   B Only the mode will change.  
   C Only the mean will change.  
   D The mean, median, and a mode will all change.

7 If year 3 experienced 6 inches of precipitation, then which statement is true?  
   A The range will not change.  
   B The median will not change.  
   C The mean will not change.  
   D The modes will not change.

8 Which change would make the mean approximately 5?  
   A Year 1 had 7 inches.  
   B Years 4 and 8 each had 5 inches.  
   C Years 4 and 7 each had 5 inches.  
   D Years 5 and 6 each had 5 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 4.03 (continued)

For Questions 9–12, suppose the box-and-whisker plot shows the amount of snowfall at Snow Village during one winter.

Snowfall (in inches) at Snow Village

9 How could the graph change if the interquartile range changed from 7 to 9?  
A The box would extend from 7 inches to 9 inches.  
B The box would extend from 6 inches to 10 inches.  
C The box would extend from 6 inches to 15 inches.  
D The box would extend from 7 inches to 14 inches.

10 If the first and third quartiles remained the same but the median increased to 11 inches, how would the graph change?  
A The line in the box would be at 11 inches, not 10 inches.  
B The ends of the box would be at 7 inches and 14 inches.  
C The ends of the whiskers would be at 3 inches and 21 inches.  
D The ends of the whiskers would be at 1 inch and 19 inches.

11 Suppose that the next year the median snowfall and interquartile range were the same as this year, but the range increased to 21 inches. Which box-and-whisker plot shows the snowfall the next year at Snow Village?

A  
B  
C  
D

12 If the box-and-whisker plot shows the snowfall at Snow Village during a subsequent winter, which is the same as that of the first year given in questions 9 and 10?  
A median  
B mode  
C mean  
D range
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)

Use the following information to answer Questions 13–15.

The frequency table shows votes for the school nickname at Blue Ridge School.

<table>
<thead>
<tr>
<th>Nickname</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howlers</td>
<td>22</td>
</tr>
<tr>
<td>Raccoons</td>
<td>16</td>
</tr>
<tr>
<td>Gem Stones</td>
<td>12</td>
</tr>
<tr>
<td>Hares</td>
<td>10</td>
</tr>
</tbody>
</table>

13 If 4 students were absent and they all voted for Gem Stones when they returned to school, which statement is true?
   A The median number of votes for one nickname was 18.
   B The mode number of votes for one nickname was 16.
   C The mean number of votes for one nickname decreased by 4.
   D The range of the number of votes increased by 4.

14 Which could be the frequency table if the range of the number of votes increased to 16?

A

| Nickname   | Frequency |   |
|------------|-----------|
| Howlers    | 30        |
| Raccoons   | 16        |
| Gem Stones | 4         |
| Hares      | 10        |

B

<table>
<thead>
<tr>
<th>Nickname</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howlers</td>
<td>24</td>
</tr>
<tr>
<td>Raccoons</td>
<td>16</td>
</tr>
<tr>
<td>Gem Stones</td>
<td>12</td>
</tr>
<tr>
<td>Hares</td>
<td>8</td>
</tr>
</tbody>
</table>

C

<table>
<thead>
<tr>
<th>Nickname</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howlers</td>
<td>18</td>
</tr>
<tr>
<td>Raccoons</td>
<td>16</td>
</tr>
<tr>
<td>Gem Stones</td>
<td>16</td>
</tr>
<tr>
<td>Hares</td>
<td>10</td>
</tr>
</tbody>
</table>

D

<table>
<thead>
<tr>
<th>Nickname</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howlers</td>
<td>18</td>
</tr>
<tr>
<td>Raccoons</td>
<td>18</td>
</tr>
<tr>
<td>Gem Stones</td>
<td>14</td>
</tr>
<tr>
<td>Hares</td>
<td>10</td>
</tr>
</tbody>
</table>

15 If the 4 absent students all voted for Raccoons, then which statement is true?
   A The mean was 15.
   B The mode was 15.
   C The median was 16.
   D The range was 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 4.04** Identify outliers and determine their effect on the mean, median, mode, and range of a set of data.

*Use the following information to answer Questions 1–4.*

The table shows the number of multiple births in the United States in the year 2000.

<table>
<thead>
<tr>
<th>Multiple Birth</th>
<th>Number of Multiple Births in U.S. (2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin</td>
<td>118,916</td>
</tr>
<tr>
<td>Triplet</td>
<td>674</td>
</tr>
<tr>
<td>Quadruplet</td>
<td>506</td>
</tr>
<tr>
<td>Quintuplet and higher</td>
<td>77</td>
</tr>
</tbody>
</table>

1. About what was the average (mean) number of multiple births in 2000 in the United States?
   - A 590
   - B 674
   - C 5,043
   - D 30,043

2. What was the range of the number of multiple births?
   - A 120,173
   - B 118,993
   - C 118,839
   - D 117,659

3. The number of quadruplet births was about what percent of the number of twin births?
   - A 0.4%
   - B 0.6%
   - C 2.4%
   - D 4%

4. Which is true?
   - A The number of quintuplet and higher births is about 25 percent of the sum of the number of triplet and quadruplet births.
   - B The same number of children was born in triplet births as in quadruplet births.
   - C Two more children were born in triplet births than in quadruplet births.
   - D Two more children were born in quadruplet births than in triplet births.
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 5–8.
The table shows prices for items available at a store on the Outer Banks.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flag</td>
<td>$19.99</td>
</tr>
<tr>
<td>Single line kite</td>
<td>$13.99</td>
</tr>
<tr>
<td>Box kite</td>
<td>$22.99</td>
</tr>
<tr>
<td>Specialty kite</td>
<td>$62.99</td>
</tr>
<tr>
<td>Stunt kite</td>
<td>$135.00</td>
</tr>
<tr>
<td>Windmill</td>
<td>$52.99</td>
</tr>
<tr>
<td>Water balloon launcher</td>
<td>$12.99</td>
</tr>
</tbody>
</table>

5 What is the range of prices of these items?
A $122.01
B $49.00
C $45.85
D $22.99

6 What is the mean price?
A $22.99
B $45.85
C $49.00
D $122.01

7 What is the median price?
A $22.99
B $45.85
C $49.00
D $122.01

8 Which of the prices in the table are outliers?
A $12.99
B $62.99
C $135.00
D There are no outliers.

9 If 100 is added to the set of data {2, 5, 7, 7, 9, 12}, which will be true?
A The median will increase greatly.
B The interquartile range will increase greatly.
C The mode will increase greatly.
D The mean will increase greatly.
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)

For Questions 10–13, use the table of costs of hang gliding lessons offered at Jockey’s Ridge State Park.

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>$85</td>
</tr>
<tr>
<td>Demo</td>
<td>$65</td>
</tr>
<tr>
<td>Ground introduction</td>
<td>$35</td>
</tr>
<tr>
<td>Advanced</td>
<td>$75</td>
</tr>
<tr>
<td>2-day package</td>
<td>$200</td>
</tr>
</tbody>
</table>

10 What is the average (mean) cost of these lessons?
   A $35   B $75   C $92   D $199

11 What is the range of the cost of lessons?
   A $165   B $125   C $115   D $30

12 Which costs of lessons are outliers?
   A Ground introduction
   B 2-day package
   C Ground introduction and 2-day package
   D There are no outliers.

13 How much money would Fredericka save if she signed up for the 2-day package instead of all four individual lessons?
   A $10   B $30   C $60   D $80

14 In a set of data, if the interquartile range is 6 and the lower quartile is 15, what is the lowest score that could be in the data set without being an outlier?
   A 6   B 9   C 15   D 24
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)

For Questions 15–17, use the table of America’s seafood consumption per person in 2001.

<table>
<thead>
<tr>
<th>Seafood</th>
<th>Pounds Consumed Per Person in 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shrimp</td>
<td>3.4</td>
</tr>
<tr>
<td>Tuna</td>
<td>2.9</td>
</tr>
<tr>
<td>Salmon</td>
<td>2.0</td>
</tr>
<tr>
<td>Catfish</td>
<td>1.2</td>
</tr>
<tr>
<td>Cod</td>
<td>0.6</td>
</tr>
</tbody>
</table>

15. About what is the average (mean) number of pounds of seafood consumed per person in 2001? Round your answer to the nearest tenth of a pound.
   A. 1.5 pounds  
   B. 2.0 pounds  
   C. 2.8 pounds  
   D. 3.0 pounds

16. What is the median number of pounds by type of seafood consumed?
   A. 1.5 pounds  
   B. 2.0 pounds  
   C. 2.8 pounds  
   D. 3.0 pounds

17. The population of Greenville is about 60,000. Based on the table, how many pounds of salmon did the people of Greenville consume during 2001?
   A. 30,000 pounds  
   B. 60,000 pounds  
   C. 120,000 pounds  
   D. 180,000 pounds

18. Jeon runs in marathons. His times in the last 4 marathons were 3 hours 30 minutes, 3 hours 20 minutes, 3 hours 45 minutes, and 3 hours 10 minutes. In what time must he run his next marathon for his average time for all 5 marathons to be 3 hours 25 minutes?
   A. 3 hours 20 minutes  
   B. 3 hours 30 minutes  
   C. 3 hours 40 minutes  
   D. 4 hours

64 North Carolina End-of-Grade Test, Grade 7
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 Solve problems involving two or more sets of data using appropriate statistical measures.

Use the following information to answer Questions 1–4.

The table shows the number of eggs produced per 100 layers by month in North Carolina in 2000 and 2001.

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>Year</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>1,912</td>
<td>1,951</td>
<td>July</td>
<td>1,859</td>
<td>1,903</td>
</tr>
<tr>
<td>Feb</td>
<td>1,717</td>
<td>1,739</td>
<td>Aug</td>
<td>1,859</td>
<td>1,934</td>
</tr>
<tr>
<td>Mar</td>
<td>1,894</td>
<td>1,908</td>
<td>Sept</td>
<td>1,786</td>
<td>1,903</td>
</tr>
<tr>
<td>Apr</td>
<td>1,831</td>
<td>1,844</td>
<td>Oct</td>
<td>1,877</td>
<td>1,952</td>
</tr>
<tr>
<td>May</td>
<td>1,886</td>
<td>1,917</td>
<td>Nov</td>
<td>1,882</td>
<td>1,870</td>
</tr>
<tr>
<td>June</td>
<td>1,804</td>
<td>1,862</td>
<td>Dec</td>
<td>1,934</td>
<td>1,974</td>
</tr>
<tr>
<td>Total</td>
<td>22,241</td>
<td>22,757</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. What is the mean monthly number of eggs produced per 100 layers in 2001, rounded to the nearest ten?
   A  1,960
   B  1,900
   C  1,850
   D  1,800

2. What is the range of the number of eggs produced monthly per 100 layers in 2000?
   A  307
   B  256
   C  217
   D  188

3. How many more eggs were laid in 2001 per 100 layers than in 2000?
   A  188
   B  217
   C  342
   D  516

4. Why would the egg production be lowest in February?
   A  February is the coldest month.
   B  February has the least amount of daylight.
   C  There is the least amount of food available in February.
   D  February has the least number of days.
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 5–9, use the stem-and-leaf plot of test scores in two classes.

<table>
<thead>
<tr>
<th>Mr. Jones</th>
<th>Miss Murray</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 55 4 2 1 0 9 2 3 7 7 9</td>
<td></td>
</tr>
<tr>
<td>8 8 7 3 2 8 4 6 8</td>
<td></td>
</tr>
<tr>
<td>9 9 6 4 7 0 1 1 6</td>
<td></td>
</tr>
<tr>
<td>1 6 3 4 5 5 5 6</td>
<td></td>
</tr>
<tr>
<td>9 7 5 5 0 8</td>
<td></td>
</tr>
</tbody>
</table>

5 How many students were in each class?
A 99 students
B 40 students
C 30 students
D 20 students

6 What was the mode in Miss Murray’s class?
A 65
B 71
C 95
D 97

7 How much higher was the median in Mr. Jones’ class than in Miss Murray’s class?
A 62
B 14
C 12
D 5

8 What was the range of test scores in Mr. Jones’ class?
A 36
B 40
C 49
D 95

9 What was the mean test score in Miss Murray’s class?
A 65
B 71
C 76
D 81
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)

Use the following information to answer Questions 10–14.

Emily asked the 20 students in her science class how many cars their families have and how many television sets they have in their house. The results are shown in the bar graph.

10. What is the mean number of cars?
   A. 2.4 cars
   B. 3 cars
   C. 7 cars
   D. 8 cars

11. What is the mean number of television sets?
   A. 2.4 television sets
   B. 3 television sets
   C. 7 television sets
   D. 8 television sets

12. Which statement is true about the median?
   A. The median number of cars is 1 more than the median number of television sets.
   B. The median number of cars is 2 more than the median number of television sets.
   C. The median number of television sets is 1 more than the median number of cars.
   D. The median number of television sets is the same as the median number of cars.

13. What is the range of the number of television sets?
   A. 4
   B. 5
   C. 6
   D. 8

14. How many more television sets were there than cars?
   A. 1
   B. 6
   C. 8
   D. 12
Use the following information to answer Questions 15–20.
The box-and-whisker plot shows the height in inches of 7th grade boys and girls.

Heights of 7th Graders

15 The range of heights for boys is how many more inches than the range for girls?
   A 6 inches
   B 12 inches
   C 18 inches
   D 24 inches

16 What is the median height for boys?
   A 58 inches
   B 60 inches
   C 63 inches
   D 68 inches

17 About what percent of the girls are between 54 and 58 inches tall?
   A 100%
   B 75%
   C 50%
   D 25%

18 About what percent of the boys are more than 63 inches tall?
   A 25%
   B 50%
   C 75%
   D 100%

19 About the middle 50 percent of the girls are between what heights?
   A 50 inches and 54 inches
   B 54 inches and 58 inches
   C 54 inches and 62 inches
   D 58 inches and 62 inches

20 If there are 40 boys in this survey, about how many are more than 68 inches tall?
   A 4 boys
   B 10 boys
   C 20 boys
   D 25 boys
OBJECTIVE 5.01 Identify, analyze, and create linear relations, sequences, and functions using symbols, graphs, tables, diagrams, and written descriptions.

Use the following information to answer Questions 1 and 2.
The table shows lengths and charges for kayak trips from an outdoor outfitter company. Prices vary depending on the season, and on what equipment is provided. As a homework assignment you write an equation for the line that best fits this data. Your equation is \( y = 10.5x + 10.875 \), where \( x \) is the number of hours and \( y \) is the price.

<table>
<thead>
<tr>
<th>Length (hours)</th>
<th>2.5</th>
<th>2.5</th>
<th>3</th>
<th>2</th>
<th>1.5</th>
<th>2.5</th>
<th>2.5</th>
<th>1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$35</td>
<td>$40</td>
<td>$42</td>
<td>$30</td>
<td>$25</td>
<td>$40</td>
<td>$35</td>
<td>$29</td>
</tr>
</tbody>
</table>

1. Using your equation, about how much would you expect to pay for a 4-hour kayak trip from this outfitter company?
   A. $25
   B. $53
   C. $65
   D. $85

2. Using your equation, which is a reasonable length for a trip that costs $37 from this outfitter company? Round your answer to the nearest tenth.
   A. 2.0 hours
   B. 2.5 hours
   C. 3.0 hours
   D. 4.5 hours

3. Bari can plant 3 tomato plants in an hour. Which table gives the relationship between the time in hours and the number of tomato plants Bari can plant?
   A
<table>
<thead>
<tr>
<th>Time</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
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<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
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</tbody>
</table>
   B
<table>
<thead>
<tr>
<th>Time</th>
<th>Number</th>
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<tr>
<td>1</td>
<td>3</td>
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<tr>
<td>2</td>
<td>4</td>
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<tr>
<td>3</td>
<td>5</td>
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</tbody>
</table>
   C
<table>
<thead>
<tr>
<th>Time</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
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<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>
   D
<table>
<thead>
<tr>
<th>Time</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</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 5.01 (continued)

Use the following information to answer Questions 4 and 5.
The table shows the time it takes Carlos to ride his bike various distances.

<table>
<thead>
<tr>
<th>Miles</th>
<th>5</th>
<th>10</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>30 min</td>
<td>1 hour</td>
<td>2.5 hours</td>
<td>3 hours</td>
</tr>
</tbody>
</table>

4 Which equation gives the distance \( d \) in miles, in terms of the time \( t \) in hours?
   A \( t = 5d \)  
   B \( t = 10d \)  
   C \( d = 5t \)  
   D \( d = 10t \)

5 At this rate, how long should it take Carlos to ride his bike from Greensboro to Winston-Salem, a distance of 26 miles?
   A 2.6 hours  
   B \( 3 \frac{1}{2} \) hours  
   C \( 4 \frac{1}{3} \) hours  
   D 26 hours

Use the following information to answer Questions 6 and 7.
The graph shows the number of multiplication facts that Jay can recite in a given time.

6 How many multiplication facts would you expect Jay to be able to recite in 60 seconds?
   A 20 facts  
   B 24 facts  
   C 28 facts  
   D 32 facts

7 How long would you expect it to take Jay to recite 40 multiplication facts?
   A 100 seconds  
   B 80 seconds  
   C 60 seconds  
   D 16 seconds
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)

8 What is the value of $2a + b - 4$ if $a = 7$ and $b = 8$?
   A 2  B 13  C 18  D 26

9 What is the solution of $a + 12 = 46$?
   A 12  B 24  C 34  D 58

10 What is the next term in the pattern 7, 11, 15, 19, ...?
   A 20  B 21  C 23  D 25

11 What is the next term in the pattern $\frac{1}{2}$, $\frac{2}{7}$, $\frac{3}{12}$, $\frac{4}{17}$, $\frac{5}{22}$, ...?
   A $\frac{1}{8}$  B $\frac{4}{25}$  C $\frac{3}{14}$  D $\frac{2}{9}$

12 What is the next term in the pattern 1, 1, 2, 3, 5, 8, ...?
   A 11  B 12  C 13  D 15

13 What is the next figure in the pattern?

- 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 5.01 (continued)

14 What is the solution of $3x - 7 = 2$?
   A 3  B $\frac{14}{3}$  C $\frac{15}{3}$  D 6

15 What is the value of $2|x| - 3y$ if $x = -5$ and $y = 6$?
   A $-30$  B $-11$
   C $-8$  D 8

16 What is the rule for this sequence? 26, 23, 20, 17, 14, …
   A Subtract 3 from the preceding term.
   B Add 3 to the preceding term.
   C Divide the preceding term by 3.
   D Multiply the preceding term by 3.

17 What does $2x + 7y - x - 2y$ equal?
   A $x + 5y$  B $2 + 5y$
   C $2 + 5$  D $6xy$

18 What does $2(3x - 4)$ equal?
   A $-2x$  B $6x - 4$
   C $6x - 8$  D $5x - 4$

19 What does $7 + (2)(3) - 4$ equal?
   A 5  B 7
   C 9  D 23

20 Which is the graph of a linear relation?
   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 5.02 Translate among different representations of algebraic expressions, equations and inequalities.

1 Which description would fit the graph?

- A The number of pennies Montrell has if he gives away 2 every day.
- B The number of pennies Montrell has if his mother gives him 2 every day.
- C The number of pennies Montrell has if he gives away 2 the first day, 4 the next day, 8 the day after that, and so forth.
- D The number of pennies Montrell has if he gets none and gives none away.

2 Fluffy the kitten received 3 toys when she was 1 year old. Each year Fluffy received 2 more toys for her birthday. Which graph could represent the number of toys that Fluffy had after several years?

- 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 5.02 (continued)

3 Suppose \( y \) varies directly with \( x \) and \( y = 6 \) when \( x = 2 \). Which equation relates \( x \) and \( y \)?

\[ \text{A} \quad y = 3x \]
\[ \text{B} \quad y = \frac{1}{2}x \]
\[ \text{C} \quad y = 4x \]
\[ \text{D} \quad y = \frac{1}{4}x \]

3 __________

4 Which is an algebraic expression for 2 more than 3 times a number?

\[ \text{A} \quad 2 - 3n \]
\[ \text{B} \quad 2 + 3n \]
\[ \text{C} \quad 2 + 3 + n \]
\[ \text{D} \quad 2 > 3n \]

4 __________

5 Which is an algebraic expression for one-third of a number decreased by 7?

\[ \text{A} \quad \frac{1}{3}n + 7 \]
\[ \text{B} \quad \frac{1}{3}n < 7 \]
\[ \text{C} \quad 7 - \frac{1}{3}n \]
\[ \text{D} \quad \frac{1}{3}n - 7 \]

5 __________

6 What does \((x^2 + 7x + 12) + (2x^2 - 3x + 5)\) equal?

\[ \text{A} \quad 2x^4 + 4x^2 + 17 \]
\[ \text{B} \quad 24x^3 \]
\[ \text{C} \quad 3x^2 + 10x + 5 \]
\[ \text{D} \quad 3x^2 + 4x + 17 \]

6 __________

7 Which is the graph of \( y = -2x + 4 \)?

\[ \text{A} \]
\[ \text{B} \]
\[ \text{C} \]
\[ \text{D} \]
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 5.02 (continued)

8 Which inequality represents twice a number \( n \) is less than 12?
   A \( 2n < 12 \)  
   B \( 2n - 12 \)  
   C \( 2 + n = -12 \)  
   D \( n < 12 \)

9 Which expression represents half a number \( x \)?
   A \( 2x \)  
   B \( x \div \frac{1}{2} \)  
   C \( x + \frac{1}{2} \)  
   D \( \frac{1}{2}x \)

10 Lanada bought a mandolin for \( \$7,200 \). If the tax was 6 percent, which expression gives the price of the mandolin including tax?
   A \( 7,200 - 0.06 \)  
   B \( 7,200 \times 1.06 \)  
   C \( 7,200 + 0.06 \)  
   D \( 7,200 - 0.6 \)

11 A banjo costs \( \$1,630 \) less than a guitar. If the sum of the prices of the 2 instruments is \( \$6,020 \), which equation could be used to determine the cost of the guitar \( x \)?
   A \( x + 1,630 = 6,020 \)  
   B \( x - 1,630 = 6,020 \)  
   C \( x + x - 1,630 = 6,020 \)  
   D \( x + x + 1,630 = 6,020 \)

12 Great Smoky Mountain National Park has 484 miles of roads. Of these roads, 238 miles are paved. If \( x \) miles are unpaved, which equation could be used to find the number of miles of unpaved roads in the park?
   A \( 238 + x = 484 \)  
   B \( 484 + x = 238 \)  
   C \( 238x = 484 \)  
   D \( 484x = 238 \)

13 Which inequality represents 3 more than \( h \) horses is less than 42?
   A \( 3h < 42 \)  
   B \( 3h = -42 \)  
   C \( 3 + h < 42 \)  
   D \( 3 + h - 42 \)

14 Which equation represents 6 percent of \( y \) is 15?
   A \( 0.06y = 15 \)  
   B \( 6y = 15 \)  
   C \( y + 0.06 = 15 \)  
   D \( \frac{y}{6} = 15 \)
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)

15 Which expression represents the sum of twice the width \( w \) and twice the length \( \ell \) of a rectangle?

A \((w + 2) + (\ell + 2)\)  
B \(2w + 2\ell\)  
C \((2w)(2\ell)\)  
D \((2 + w)(2 + \ell)\)

16 Which equation represents the situation that there are 10 more boys \( b \) than girls \( g \) at the bowling alley?

A \(10g = b\)  
B \(10b = g\)  
C \(g = b + 10\)  
D \(b = g + 10\)

17 Which expression is equivalent to \(\frac{x + 3}{4}\)?

A \(\frac{1}{4}x\)  
B \(4x\)  
C \(\frac{4}{x}\)  
D \(x \div \frac{1}{4}\)

18 Which expression is equivalent to \(5(2x + 3)\)?

A \(7x + 3\)  
B \(25x\)  
C \(10x + 3\)  
D \(10x + 15\)

19 Which equation is satisfied by the values in the table?

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

A \(y = -5x\)  
B \(y = -x\)  
C \(y = x - 6\)  
D \(y - x = 6\)

20 Which is a verbal phrase for \(6(n + 1)\)?

A One more than six times a number  
B Six times the sum of a number and one  
C Six times the difference of a number and one  
D Six more than the sum of 1 and a number
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** Use and evaluate algebraic expressions, linear equations or inequalities to solve problems.

**Use the following information to answer Questions 1 and 2.**

In North Carolina in 2003 the most popular name for a new baby girl was Hannah and the second most popular name was Taylor. Suppose that at a North Carolina hospital, 200 baby girls born in 2003 were given one of those two names and that 40 more were named Hannah than Taylor.

1. Which equation gives \(x\), the number of babies named Taylor born at this hospital in 2003?
   - A \(2x + 40 = 200\)
   - B \(x + 40 = 200\)
   - C \(x - 40 = 200\)
   - D \(2x = 200\)

2. How many babies born at this hospital in 2003 were named Hannah?
   - A 40
   - B 80
   - C 120
   - D 200

**Use the following information to answer Questions 3–5.**

The enrollment at Appalachian University was about twice that of the enrollment at Western Carolina University in 2003.

3. If both universities together had about 21,000 students enrolled in 2003 and \(x\) represents the number of students at Western Carolina University, which expression represents the enrollment at Appalachian University?
   - A \(\frac{21,000}{2}\)
   - B \(x + 2\)
   - C \(2x\)
   - D \(\frac{x}{2}\)

4. Which equation could be used to find the enrollment at Western Carolina University in 2003?
   - A \(x + 2 = 21,000\)
   - B \(x + \frac{x}{2} = 21,000\)
   - C \(2x = 21,000\)
   - D \(3x = 21,000\)

5. What was the approximate enrollment at Appalachian University in 2003?
   - A 7,000
   - B 10,500
   - C 14,000
   - D 21,000
Standards Practice

Use the following information to answer Questions 6 and 7.

The Swinging Bridge cost x dollars to build in 1952. When it was rebuilt in 1999, the cost was $300,000. This was $45,000 more than 17 times the original cost to build.

6 Which equation could be used to find the original cost?

A  \( x + x + 45,000 = 300,000 \)
B  \( x + x + 17 = 45,000 \)
C  \( 45,000x = 300,000 \)
D  \( 17x + 45,000 = 300,000 \)

7 What was the original cost to build the Swinging Bridge?

A $15,000
B $30,000
C $45,000
D $150,000

8 What is the value of \( 4m + 3n \) if \( m = -2 \) and \( n = 6 \)?

A 26
B 20
C 11
D 10

For Questions 9 and 10, use the figure illustrating a rectangular stained glass window.

If \( x = 15 \) inches and \( y = 6 \) inches, what are the dimensions of the window?

A 27 inches by 77 inches
B 27 inches by 50 inches
C 36 inches by 50 inches
D 36 inches by 36 inches

What is the perimeter of the triangular part of the window?

A 172 inches
B 90 inches
C 54 inches
D 36 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 5.03 (continued)

Use the following information to answer Questions 11 and 12.
If Luke had 4 more pairs of shoes, he would have more than 17 pairs.

11 Which inequality represents this situation where \( x \) is the number of pairs of shoes Luke has now?
   \[ \text{A } x + 17 > 4 \quad \text{B } x \geq 17 + 4 \]
   \[ \text{C } x - 4 < 17 \quad \text{D } x + 4 > 17 \]

12 Which is a possible number of pairs of shoes that Luke has now?
   \[ \text{A } 14 \text{ pairs} \quad \text{B } 13 \text{ pairs} \]
   \[ \text{C } 12 \text{ pairs} \quad \text{D } 4 \text{ pairs} \]

For Questions 13 and 14, use the rectangle.

13 The perimeter of the rectangle is 42 centimeters. Which equation could be used to find the width \( x \)?
   \[ \text{A } x + 3 = 42 \quad \text{B } x(x + 3) = 42 \]
   \[ \text{C } 2x + 3 = 42 \quad \text{D } 4x + 6 = 42 \]

14 What are the dimensions of the rectangle?
   \[ \text{A } 7 \text{ centimeters by 10 centimeters} \quad \text{B } 9 \text{ centimeters by 12 centimeters} \]
   \[ \text{C } 12 \text{ centimeters by 15 centimeters} \quad \text{D } 18 \text{ centimeters by 24 centimeters} \]

15 After the temperature in Waxhaw decreased 15 degrees, it was 48 degrees. Which equation could be used to find the original temperature \( x \)?
   \[ \text{A } x - 15 = 48 \quad \text{B } \frac{x}{15} = 48 \]
   \[ \text{C } 15 - x = 48 \quad \text{D } 48 - 15 = x \]
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)

For Questions 16 and 17, 3 notebooks and 5 $1.25 pens cost a total of $13.75.

16 How much does each notebook cost?
   A $1.25
   B $2.00
   C $2.50
   D $4.25

17 Which equation could you solve to get the cost of each notebook?
   A \( x + 1.25 = 13.75 \)
   B \( 3x + 5(1.25) = 13.75 \)
   C \( x + 5(1.25) = 13.75 \)
   D \( 3x + 1.25 = 13.75 \)

For Questions 18 and 19, Lupe put money into a savings account that pays 2 percent interest per year.

18 Which inequality can Lupe use to find \( x \), the amount Lupe must put into the account so the interest will be more than $10 per year?
   A \( \frac{x}{0.02} > 10 \)
   B \( x + 2 > 10 \)
   C \( 0.2x > 10 \)
   D \( 0.02x > 10 \)

19 What amount does \( x \) represent?
   A more than $5,000
   B more than $500
   C more than $50
   D more than $5

20 A printer can print 12 pages per minute. Which equation gives the number of pages \( P \) that can be printed in 10 minutes?
   A \( (12)(10) = P \)
   B \( \frac{10}{P} = 12 \)
   C \( \frac{12}{P} = 10 \)
   D \( 12 + 10 = P \)
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 Develop fluency in the use of formulas to solve problems.

For Questions 1 and 2, the area of a circle is given by \( A = \pi r^2 \).

1 What is the area of a circle when the radius is 6 centimeters?
   A 36\( \pi \) square centimeters
   B 24\( \pi \) square centimeters
   C 12\( \pi \) square centimeters
   D 6\( \pi \) square centimeters

2 What is the radius of a circle when the area is 100\( \pi \) square centimeters?
   A 10,000 centimeters
   B 50 centimeters
   C 20 centimeters
   D 10 centimeters

For Questions 3 and 4, use the formula distance = (rate)(time).

3 How many miles will a train travel that goes 120 miles per hour for 8 hours?
   A 15 miles
   B 128 miles
   C 960 miles
   D 1,080 miles

4 If a tiger runs 3 miles in 10 minutes, how many miles per hour is it running?
   A \( \frac{3}{10} \) mile per hour
   B \( 3\frac{1}{3} \) miles per hour
   C 18 miles per hour
   D 30 miles per hour

For Questions 5 and 6, use the formula \( F = \frac{9}{5}C + 32 \) relating Centigrade temperature \( C \) and Fahrenheit temperature \( F \).

5 What Fahrenheit temperature is equivalent to 0° Centigrade?
   A -32°
   B 20°
   C 32°
   D 100°

6 About what Centigrade temperature is equivalent to 75° Fahrenheit?
   A 24°
   B 59°
   C 77°
   D 167°
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)

7. What is the area of a rectangle with length 10 inches and width 4 inches? Use the formula area = (length)(width).
   A. 40 square inches  B. 28 square inches  C. 14 square inches  D. 2.5 square inches

8. The area of a triangle equals \( \frac{1}{2} \) the base times the height. If the area is 20 square feet and the base is 10 feet, what is the height?
   A. 30 feet  B. 4 feet  C. 2 feet  D. 1 foot

9. The perimeter of a rectangle is 2 times the length plus 2 times the width. What is the perimeter of a rectangle with length 14 meters and width 3 meters?
   A. 17 meters  B. 34 meters  C. 42 meters  D. 126 meters

10. The volume of a cone is \( \frac{1}{3} \pi r^2 h \) where \( r \) is the radius and \( h \) is the height. What is the volume of a cone with radius 3 centimeters and height 8 centimeters? Use 3.14 for \( \pi \).
    A. 24 cubic centimeters  B. 72 cubic centimeters  C. 75.36 cubic centimeters  D. 226.08 cubic centimeters

11. The Pythagorean Theorem says that the hypotenuse of a right triangle squared is equal to the sum of the squares of the 2 legs \( (a^2 + b^2 = c^2) \). In the figure, how long is the hypotenuse of a right triangle if the legs have lengths 3 inches and 4 inches?

   A. 1 inch  B. 5 inches  C. 7 inches  D. 25 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 5.04** (continued)

12 The volume of a box is length times width times height. What is the volume of the box?

![Box Diagram]

- A 120 cubic inches
- B 70 cubic inches
- C 34 cubic inches
- D 17 cubic inches

13 The sum of the measures of the interior angles of a polygon is found by the formula \((n - 2)180\) where \(n\) is the number of sides of the polygon. What is the sum of the measures of the interior angles of a hexagon?

- A 540
- B 720
- C 1,078
- D 1,080

14 Use the formula \(A = \ell w\). What does \(\ell\) equal in terms of \(A\) and \(w\)?

- A \(Aw\)
- B \(A - w\)
- C \(\frac{w}{A}\)
- D \(\frac{A}{w}\)

15 What is the simple interest earned on $100 invested at 2.5 percent for 2 years?

- A $2.50
- B $5.00
- C $40.00
- D $50.00

16 If the simple interest earned is $20 at 4 percent for 5 years, how much was the principle?

- A $1.00
- B $10.00
- C $100.00
- D $1,000.00
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 5.04** (continued)

17 The volume of a sphere is given by the formula $V = \frac{4\pi r^3}{3}$ where $r$ is the radius. What is the volume of a sphere with radius 6 centimeters? Use 3.14 for $\pi$.

A 48 cubic centimeters  
B 150.72 cubic centimeters  
C 288 cubic centimeters  
D 904.32 cubic centimeters

18 The formula for the height of an object $h$ launched vertically into the air at a velocity of 75 meters per second after a time of $t$ seconds is $h = 75t - 4.9t^2$. How high is the object after 3 seconds?

A 33.9 meters  
B 180.9 meters  
C 210.3 meters  
D 220.1 meters

Use the following information to answer Questions 19 and 20.

The formula $y = 1.24x - 16$ gives the wind chill temperature $y$ at Fahrenheit temperature $x$ when the speed of the wind is 10 miles per hour.

19 What is the approximate wind chill temperature when the temperature is 10°F Fahrenheit?

A −16°F  
B −4°F  
C 4°F  
D 21°F

20 When the wind chill temperature is 20°F Fahrenheit, approximately what is the actual temperature?

A 45°F  
B 41°F  
C 29°F  
D 9°F

21 Which function models the relationship between price $x$ and tax $y$ on the graph?

A $x = 4y$  
B $x = 0.04y$  
C $y = 4x$  
D $y = 0.04x$
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 Twenty-four is 20 percent of what number?
   A 4.8   B 48   C 100   D 120

2 What is \(x\) if \(\frac{3}{5} = \frac{x}{20}\)?
   A 6   B 12   C 20   D \(33\frac{1}{3}\)

For Questions 3 and 4, \(\triangle MNO\) is similar to \(\triangle PQR\).

3 What is \(PR\)?
   A \(1\frac{7}{8}\) centimeters   B 10 centimeters
   C \(13\frac{1}{3}\) centimeters   D 15 centimeters

4 What is \(m\angle P\)?
   A 50   B 70   C 140   D \(186\frac{2}{3}\)

5 Sydney is competing in a 200-mile auto race at Lowe’s Motor Speedway in Charlotte. If she averages 120 miles per hour, which equation could you solve to find how long it will take her to complete the race in time \(t\)?
   A \(\frac{120}{t} = 200\)   B \(120t = 200\)
   C \(120 + t = 200\)   D \(\frac{t}{120} = 200\)

6 Which figures appear to be congruent?
   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.

7 Which is the equation for the graph?
   A \( y = x \)
   B \( y = -x \)
   C \( y = x + 1 \)
   D \( y = 1 \)

8 Which statement is true about \( \frac{20}{x} \) as \( x \) increases from 1 to 2?
   A It increases from 10 to 20.
   B It decreases from 20 to 10.
   C It increases from 1 to 2.
   D It decreases from 2 to 1.

9 One fruit snack contains 55 milligrams of sodium, which is about 2 percent of the recommended daily amount for an adult. How many milligrams of sodium are recommended daily for an adult?
   A 110 milligrams
   B 555 milligrams
   C 1,100 milligrams
   D 2,750 milligrams

10 Nelson has 3 sport coats and 2 ties. Which tree diagram could he use to find how many different outfits he could put together from these items?
   A
   B
   C
   D

11 Edmundo bought 3 pounds of shrimp at $8.90 per pound. Which is a reasonable estimate of the total cost of the shrimp?
   A about $9.00
   B about $18.00
   C about $27.00
   D about $36.00
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. The formula \( d = 6f \) gives the depth in feet \( d \) equivalent to \( f \) fathoms. How many feet deep is a scuba diver if he is at a depth of 8 fathoms?

A. 64 feet  
B. 48 feet  
C. 14 feet  
D. 1 \( \frac{1}{3} \) feet

13. Which stem-and-leaf plot displays the following data?

25, 27, 15, 19, 27, 36, 34, 15, and 15

A.  

<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 5 5 9</td>
</tr>
<tr>
<td>2</td>
<td>5 7 7</td>
</tr>
<tr>
<td>3</td>
<td>4 6</td>
</tr>
<tr>
<td>1</td>
<td>5 = 15</td>
</tr>
</tbody>
</table>

B.  

<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 9</td>
</tr>
<tr>
<td>2</td>
<td>5 7</td>
</tr>
<tr>
<td>3</td>
<td>4 6</td>
</tr>
<tr>
<td>1</td>
<td>5 = 15</td>
</tr>
</tbody>
</table>

C.  

<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–2</td>
<td>5 7 9</td>
</tr>
<tr>
<td>3–4</td>
<td>4 6</td>
</tr>
<tr>
<td>1</td>
<td>5 = 15</td>
</tr>
</tbody>
</table>

D.  

<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5 5 5 5 7 7 9</td>
</tr>
<tr>
<td>3</td>
<td>4 6</td>
</tr>
<tr>
<td>2</td>
<td>5 = 25</td>
</tr>
</tbody>
</table>

14. Hester was multiplying 2.9 by 7.1 on her calculator. Unfortunately some of the numbers had worn off the calculator keys so she was not sure whether she entered the numbers correctly. Which is a reasonable approximation for the product?

A. 5  
B. 10.0  
C. 16.39  
D. 21

15. What does \( 40 - 2(3 + 14) \) equal?

A. 6  
B. 21  
C. 48  
D. 646

16. What is the name of the figure?

A. prism  
B. pyramid  
C. cylinder  
D. cone
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.

17 Willie has 20 classical compact discs as shown in the table. Which bar graph shows this data?

<table>
<thead>
<tr>
<th>Composer</th>
<th>Number of CDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mozart</td>
<td>6</td>
</tr>
<tr>
<td>Beethoven</td>
<td>5</td>
</tr>
<tr>
<td>Tschaikovsky</td>
<td>7</td>
</tr>
<tr>
<td>Brahms</td>
<td>2</td>
</tr>
</tbody>
</table>

18 The formula $\frac{x_1 + x_2}{2}$ gives the x-coordinate of the midpoint between 2 points $(x_1, y_1)$ and $(x_2, y_2)$. What is the x-coordinate of the midpoint between $(-4, 6)$ and $(18, 2)$?

A 7  B 5  C 4  D 2

19 Eighteen is what percent of 30?

A 75%  B 60%  C 40%  D 18%

20 What is the solution of $-\frac{2}{3}x = 6$?

A $-2$  B $-4$  C $-9$  D $-12$
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.

21 Which is a front view drawing of this figure?

A  
B  
C  
D  

22 What is the front view of the cone?

A pyramid  
B cone  
C triangle  
D line  

23 A table is 3 times as long as it is wide. Which is a scale drawing of the table?

A  
B  
C  
D  

24 What does $3(2 + 5) - 6 \div 2$ equal?

A 18  
B 12  
C 7.5  
D 1.5  

Go on
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.

25 Which triangle is similar to the one shown?

26 Which table has data included in the graph?

27 Square corners (shaded in figure) of a 9 inch by 12 inch piece of cardboard are cut out and the sides are folded up to make an open box 2 inches high. What are the dimensions of the bottom of the box?

A 7 inches by 10 inches
B 8 inches by 11 inches
C 5 inches by 8 inches
D 4 inches by 6 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.

28 What is the volume of wax needed to make a cylindrical pillar candle 6 inches tall with a radius of 2 inches? Use 3.14 for \( \pi \).
   A 75.36 cubic inches  
   B 56.52 cubic inches  
   C 37.68 cubic inches  
   D 24 cubic inches

29 Patty and Alicia went to the water park. Patty bought an unlimited ride pass for $18.95 while Alicia bought individual water slide tickets for $0.75 each. How many times can Alicia go on the water slide before the cost of her tickets exceeds the cost of Patty’s pass?
   A 24  
   B 25  
   C 26  
   D 28

30 If the volume of a rectangular prism is 300 cubic meters, the width 15 meters, and the length 40 meters, what is the height?
   A \( \frac{1}{2} \) meter  
   B 2 meters  
   C 3 meters  
   D 4 meters

31 What is the length of each side of a cube if the volume is 27 cubic feet?
   A 9 feet  
   B \( 6\frac{3}{4} \) feet  
   C 5.2 feet  
   D 3 feet

For Questions 32 and 33, use the table showing the year that North Carolina adopted each of the state symbols.

<table>
<thead>
<tr>
<th>State Symbol</th>
<th>Year Adopted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogwood</td>
<td>1941</td>
</tr>
<tr>
<td>Cardinal</td>
<td>1943</td>
</tr>
<tr>
<td>Pine Tree</td>
<td>1963</td>
</tr>
<tr>
<td>Gray Squirrel</td>
<td>1969</td>
</tr>
<tr>
<td>Honeybee</td>
<td>1973</td>
</tr>
<tr>
<td>Eastern Box Turtle</td>
<td>1979</td>
</tr>
<tr>
<td>Milk</td>
<td>1987</td>
</tr>
<tr>
<td>Shad Boat</td>
<td>1987</td>
</tr>
<tr>
<td>Plott Hound</td>
<td>1989</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>1995</td>
</tr>
</tbody>
</table>

32 What is the mode of the years?
   A 1954  
   B 1973  
   C 1976  
   D 1987

33 The state symbol milk was adopted how many years after the state insect the honeybee was adopted?
   A 11  
   B 14  
   C 18  
   D 24
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.

34 When Rikki was in 7th grade she was 4 feet 2 inches tall and the shortest of the 60 girls in her grade. When she graduated from high school Rikki was 5 feet 6 inches tall, which was the upper quartile for the girls’ heights. About how many girls did she pass in height during those 6 years?

A 15  B 30  C 40  D 45

35 Using the formula $5x + 2y = 12$, what is $y$ when $x = 6$?

A 28  B $\frac{1}{2}$  C 0  D $-9$

36 If $S'T'$ is the image of $ST$ under a dilation of magnitude 4 and $ST = 7$, what is $S'T'$?

A $1\frac{3}{4}$  B 11  C 21  D 28

Use the following information to answer Questions 37 and 38.

Renu has a grandfather clock and an alarm clock. Both have circular faces. The radius of the face on the grandfather clock is 6 inches. The alarm clock’s radius is 1 inch.

37 If the minute hand on the grandfather clock is 5 inches long and the hands are proportional to the radii, how long is the minute hand on the alarm clock?

A $\frac{5}{6}$ inch  B 1 inch  C $\frac{6}{5}$ inches  D 2 inches

38 If the angle between the hands on the grandfather clock at 3 P.M. is $90^\circ$, what is the angle between the hands of the alarm clock at 3 P.M.?

A 90  B 60  C 30  D 15

39 Which equation is equivalent to $4x + 6 = 9x - 2$?

A $13x = 8$  B $-5x = 8$  C $5x + 6 = 2$  D $5x - 2 = 6$
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.

For Questions 40 and 41, a carton of ice cream is 8 inches long, 4 inches wide, and 3 inches high.

40 What is the volume of the ice cream? 40 ________
   A 136 cubic inches  B 96 cubic inches
   C 68 cubic inches  D 56 cubic inches

41 The carton of ice cream serves 16 people. How many cubic inches are in each serving? 41 ________
   A 4 cubic inches  B 5 cubic inches
   C 6 cubic inches  D 8 cubic inches

For Questions 42 and 43, use the table of cellular phone subscriptions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Subscriptions (1,000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>340</td>
</tr>
<tr>
<td>1990</td>
<td>5,283</td>
</tr>
<tr>
<td>1995</td>
<td>33,786</td>
</tr>
<tr>
<td>1998</td>
<td>69,208</td>
</tr>
<tr>
<td>1999</td>
<td>86,047</td>
</tr>
<tr>
<td>2000</td>
<td>109,478</td>
</tr>
<tr>
<td>2001</td>
<td>128,375</td>
</tr>
</tbody>
</table>

42 What is the lowest quartile? 42 ________
   A 5,283,000
   B 69,209,000
   C 104,195,000
   D 109,478,000

43 What is the interquartile range? 43 ________
   A 5,283,000
   B 69,209,000
   C 104,195,000
   D 109,478,000
44 Which triangle is similar to the one shown?

- A
- B
- C
- D

45 Mt. Mitchell is 6,684 feet high. Mt. McKinley is 20,320 feet high. Mt. McKinley is about how many times as tall as Mt. Mitchell?

- A 6
- B 5
- C 4
- D 3

46 A fast-food restaurant sells hamburgers that are 5 inches in diameter and junior-sized hamburgers that are 3 inches in diameter. What is the scale factor between the diameters of these two sizes of hamburgers?

- A \( \frac{10}{3} \)
- B \( \frac{5}{2} \)
- C \( \frac{5}{3} \)
- D \( \frac{5}{6} \)

47 \( \triangle DEF \) is similar to \( \triangle GHI \). If \( DE = 4 \) meters, \( EF = 6 \) meters, and \( GH = 8 \) meters, what is \( HI? \)

- A 6 meters
- B 8 meters
- C 10 meters
- D 12 meters

48 A pair of black bears lives in Pisgah National Forest. The male bear weighs 600 pounds and the female 150 pounds. They have 2 cubs that weigh 11 pounds and 15 pounds. How much less is the average weight of all 4 bears than the average weight of just the 2 adult bears?

- A 13 pounds
- B 181 pounds
- C 194 pounds
- D 375 pounds

49 If \( \square ABCD \cong \square EFGH \), what is the ratio of \( \frac{BC}{FG}? \)

- A \( \frac{10}{1} \)
- B \( \frac{2}{1} \)
- C \( \frac{1}{1} \)
- D \( \frac{1}{2} \)
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.

50 A 12-ounce can of cola contains 140 calories. To the nearest whole calorie, how many calories are in a 16-ounce bottle of the same cola?
   A 187    B 175
   C 152    D 105

Use the following information to answer Questions 51–55.
The bar graph shows the average number of hours 7th and 8th graders spent doing homework per day.

51 Which grade has more students studying less than 2 hours per day?
   A 8th grade
   B 7th grade
   C 7th and 8th graders are the same
   D 9th graders study more

52 How many total students reported studying \(2 \frac{1}{2}\) hours per day?
   A 20
   B 11
   C 8
   D 4

53 Which group has a higher mode, and what is it?
   A 7th graders; 1.5
   B 7th graders; 10
   C 8th graders; 2
   D 8th graders; 10

54 Which group has a higher median, and what is it?
   A 7th graders; 1.5
   B 7th graders; 1
   C 8th graders; 2
   D They’re the same; 1.5

55 How many more 8th graders than 7th graders were included in the survey?
   A 4
   B 5
   C 6
   D 9
56 How much is the 4 percent tax on a $30 sweater?
   A $1.20 B $2.60 C $7.50 D $12

57 The Henrietta Riverboat could travel 115 miles from Fayetteville to Wilmington in less than 10 hours. Which inequality could be used to find the average speed \( s \) of the boat?
   A \( \frac{115}{s} < 10 \) B \( \frac{115}{s} > 10 \) C \( 115s > 10 \) D \( 115s < 10 \)

58 What is the interquartile range for the data shown in the figure?
   A 2 B 2.5 C 3 D 3.5

Use the following information to answer Questions 59 and 60.
The table shows the value of major North Carolina seafood catches in 2001, rounded to the nearest thousand dollars.

<table>
<thead>
<tr>
<th>Seafood</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Crab</td>
<td>$32,231,000</td>
</tr>
<tr>
<td>Hard Clam</td>
<td>$5,007,000</td>
</tr>
<tr>
<td>Atlantic Menhaden</td>
<td>$4,551,000</td>
</tr>
<tr>
<td>Sea Scallop</td>
<td>$1,692,000</td>
</tr>
<tr>
<td>Yellow Fin Tuna</td>
<td>$1,461,000</td>
</tr>
<tr>
<td>King Mackerel</td>
<td>$1,344,000</td>
</tr>
</tbody>
</table>

59 Which is the most representative “average” value of these catches?
   A mean B mode C median D total

60 Identify the outlier(s).
   A Blue Crab and Hard Clam
   B Blue Crab
   C King Mackerel, Yellow Fin Tuna
   D King Mackerel
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.

61 Which function gives the values in the table?

<table>
<thead>
<tr>
<th></th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>y = 2x + 3</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>y = ( \frac{1}{2}x + 6 )</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>y = -2x + 11</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>y = (-\frac{1}{2}x + 8)</td>
<td></td>
</tr>
</tbody>
</table>

62 The Venn diagram shows the summer activities of a group of high school students. How many of these students are going to summer school and are not working?

A 17
B 15
C 12
D 7

63 What is the value of \(5ab - b^2 + 3\) if \(a = 6\) and \(b = 2\)?

A 59
B 61
C 299
D 3,367

64 What is the value of \(x^2 - 2x\) if \(x = 4\)?

A 0
B 8
C 16
D 24

65 The net would form a triangular prism. Which would be the base of the prism?

A rectangle, 3 inches by 6 inches
B isosceles triangle, sides 5 inches, 5 inches, and 3 inches
C rectangle, 5 inches by 6 inches
D hexagon, sides 3 inches, 5 inches, 6 inches, 5 inches, 3 inches, and 6 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.

66 Viktor has 6 granola bars to share evenly with 3 friends. How much does each person get?  
A \( \frac{2}{3} \) bar  
B \( 1\frac{1}{2} \) bars  
C 2 bars  
D 3 bars 

For Questions 67 and 68, use the box-and-whisker plot.

67 Which is the interquartile range?  
A The difference between \( A \) and \( E \).  
B The difference between \( D \) and \( B \).  
C The difference between \( C \) and \( E \).  
D The difference between \( A \) and \( C \). 

68 What is the median?  
A \( \frac{B + D}{2} \)  
B \( B \)  
C \( C \)  
D \( \frac{E - A}{2} \) 

69 Kosla went fishing at Jordan Lake. He caught 2 bass, 3 bluegill, 5 sunfish, and 10 crappie. Which graph shows this data? 

70 Which expression represents the speed of a bicyclist on Cades Cove Loop Road who travels the 11 miles in \( x \) hours?  
A \( 11x \)  
B \( \frac{11}{x} \)  
C \( 11 - x \)  
D \( \frac{x}{11} \)
**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.

71 Vivian is having her hair braided into micros, which will cost $250 and take $12\frac{1}{2}$ hours. How much is she paying per hour?

- **A** $25
- **B** $20
- **C** $15
- **D** $12

72 The table shows the lengths of several rivers. Which box-and-whisker plot shows this data?

<table>
<thead>
<tr>
<th>River</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennessee</td>
<td>886 miles</td>
</tr>
<tr>
<td>French Broad</td>
<td>352 miles</td>
</tr>
<tr>
<td>Kanawha-New</td>
<td>435 miles</td>
</tr>
<tr>
<td>Pee Dee-Yadkin</td>
<td>538 miles</td>
</tr>
<tr>
<td>Santee-Wateree-Catawba</td>
<td>150 miles</td>
</tr>
</tbody>
</table>

- **A**
- **B**
- **C**
- **D**

73 You have test grades of 92, 80, 96, and 100. What must you get on the 5th test to have an overall average of 90? Assume all tests count the same amount.

- **A** 82
- **B** 88
- **C** 90
- **D** 94

74 If $\triangle JKL \sim \triangle MNO$, what is true about $\angle L$ and $\angle O$?

- **A** They are images of each other under a rotation.
- **B** They are images of each other under a reflection.
- **C** They are proportional but not congruent.
- **D** They are congruent.

75 Which equation represents the number of rows $r$ of trees that can be planted if there are 120 trees and 15 trees in each row?

- **A** $\frac{15}{r} = 120$
- **B** $r + 15 = 120$
- **C** $\frac{r}{15} = 120$
- **D** $15r = 120$
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 The table shows the number of bushels of several crops harvested in North Carolina in 2001. What is the mean number of bushels?

A 1,277,260  B 3,515,000  C 25,545,200  D 74,610,000

<table>
<thead>
<tr>
<th>Crop</th>
<th>Bushels (1,000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>1,206</td>
</tr>
<tr>
<td>Corn</td>
<td>78,125</td>
</tr>
<tr>
<td>Oats</td>
<td>1,680</td>
</tr>
<tr>
<td>Potatoes</td>
<td>3,515</td>
</tr>
<tr>
<td>Soybeans</td>
<td>43,200</td>
</tr>
</tbody>
</table>

**Use the following information to answer Questions 77 and 78.**

The Carolina Blue Bank gives 5 free ATM transactions per month then charges $2 for each additional transaction. The Wolfpack Bank charges $0.75 for every ATM transaction.

77 How many ATM transactions would you need to make in a month in order for the Wolfpack Bank plan to cost less?

A less than 5  B less than 8  C more than 8  D more than 12

78 Which inequality could be used to solve the problem in question 77, where \( x \) is the number of transactions? 5-03

A \( 2x > 5 \)  B \( 2(x - 5) > 0.75x \)  C \( 0.75x > 5 \)  D \( 2x - 5 > 0.75x \)

**For Questions 79 and 80, use the graph showing zoo attendance in 2003.**

79 Which situation would increase the range of attendance?

A Add a zoo with attendance less than 0.6 million.  B Add a zoo with attendance between 0.6 and 0.7 million.  C Add a zoo with attendance between 0.7 and 3 million.  D Add a zoo with attendance between 2 and 3 million.

80 Which situation would decrease the mean attendance?

A Add a zoo with attendance greater than 3 million.  B Add a zoo with attendance between 2 and 3 million.  C Add a zoo with attendance between 1.5 and 2 million.  D Add a zoo with attendance less than 1.5 million.