Name _____ Date _____ Class _____

Diagnostic Test

Select the best answer for questions 1–60. Fill in the correct bubble on your answer sheet.

1. Which rule will generate the values of y from the values of x?

x	1	2	3	4
y	-4	-1	4	11

- **A** Subtract 5 from the cube of x.
- **B** Subtract 8 from the square of $x + 1$.
- **C** Add 7 to x.
- **D** Subtract 5 from the square of x.

2. The numbers represented below are called square numbers. What is the next number in the pattern?
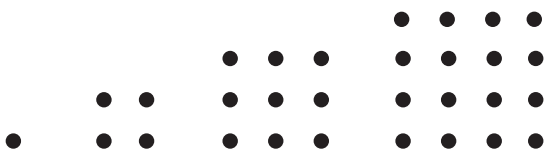
- **F** 17
- **G** 20
- **H** 24
- **I** 25

3. The average cat consumes about $1.27 \cdot 10^5$ calories per year. Which shows that number in standard notation?

- **A** 1,270
- **B** 12,700
- **C** 127,000
- **D** 1,270.000

4. Use the order of operations to simplify the expression
$(9 - 2^2) \times (36 \div 9) + 8$.

- **F** 25
- **G** 26
- **H** 27
- **I** 28

5. A technician scoops out 25 gallons of a chemical from a container containing 300 gallons of the chemical. Which equation can be used to find how much of the chemical, p, remains?

- **A** $25p = 300$
- **B** $300 \div 25 = p$
- **C** $p - 25 = 300$
- **D** $300 - 25 = p$

6. What is the value of $3x^2 + 2$ when $x = -4$?

- **F** -142
- **G** -46
- **H** 50
- **I** 146

Holt Mathematics Grade 7

Name _____ Date _____ Class _____

Diagnostic Test *continued*

7. Bill had 322 stamps. He can put 23 stamps on each page of an album. He estimated he would need $300 \div 25$ or 12 pages in all. Is it reasonable that Bill buys 12 album pages?

A No, he rounded 23 up and 322 down, so he will need more than 12 pages.

B No, he only needs 11 pages.

C No, he rounded, so he will need less than 12 pages.

D Yes.

8. The AquaZoo aquarium will put a maximum of 15 fish in each display tank. How many tanks will they need to display 565 fish?

F at least 36 tanks

G at least 37 tanks

H exactly 37.67 tanks

I at least 38 tanks

9. There are 1,860 steps from the street level of the Empire State Building to the observation deck on the 102nd floor. What is the prime factorization of 1,860?

A $2 \times 3^2 \times 7 \times 9$

B $2^2 \times 3 \times 5 \times 31$

C $2^2 \times 3 \times 5 \times 7 \times 11$

D $2 \times 3^2 \times 5 \times 29$

10. One bowling alley gives awards for the highest average scores. The table shows the four top averages. Who won the third-place trophy?

Bowler	Average Score
Don	218.178
Pete	218.036
Susan	218.158
Earlene	218.060

F Don   **H** Susan

G Pete   **I** Earlene

11. Rachel bought $3\frac{2}{3}$ pounds of grapes. Her brother ate $\frac{1}{3}$ of the grapes. Then her father ate $\frac{1}{8}$ of the grapes that were left over. How many pounds of grapes are left?

A $2\frac{5}{36}$ pounds

B $2\frac{5}{16}$ pounds

C $2\frac{5}{8}$ pounds

D $3\frac{5}{24}$ pounds

12. What is the effect of multiplying a whole number by a number less than 1 and greater than 0?

F The product will be less than 0.

G The product will be greater than 0 and less than 1.

H The product will be greater than 1.

I The product will be less than the whole number.

Holt Mathematics Grade 7

Diagnostic Test continued

13. Warren bought a piece of pipe $8\frac{3}{4}$ feet long. He cut off a piece $4\frac{11}{12}$ feet long to fix the shower. How much extra pipe did he have?
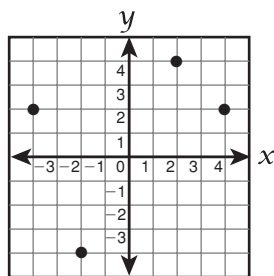
A $3\frac{7}{12}$ feet

B $3\frac{5}{6}$ feet

C $4\frac{1}{12}$ feet

D $4\frac{3}{4}$ feet

14. What is the solution to the following equation?

$$-\left(\frac{t}{6}\right) = 24$$

F $t = 4$

G $t = -4$

H $t = -144$

I $t = 144$

15. Which ordered pair corresponds to a point plotted on the coordinate grid?

A $(-4, -2)$
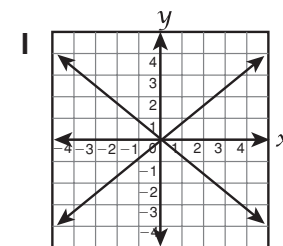
B $(-4, 2)$

C $(-2, 4)$
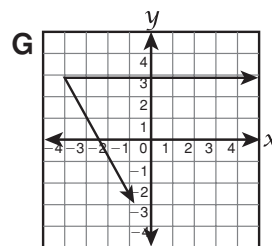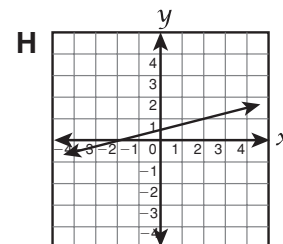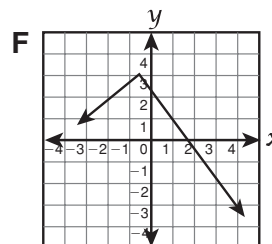
D $(4, -2)$

16. When the point (5, 1) is translated 4 units to the right and 3 units down, what are the new coordinates?

F $(1, -2)$

H $(5, -2)$

G $(9, -1)$

I $(9, -2)$

17. There are 126 students in 4 seventh grade classes. Three classes each have 31 students. How many students are in the fourth class?
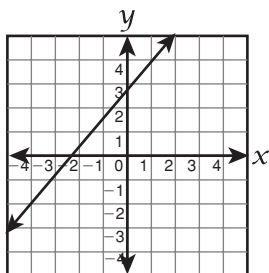
A 31   **C** 33

B 32   **D** 34

18. Which of the following graphs is linear?

Holt Mathematics Grade 7

Diagnostic Test continued

19. Which could be the ordered pair for the point where the line in the following graph crosses the *y*-axis?

A $(\frac{5}{2}, 0)$ **C** $(-2, 0)$

B $(0, -2)$ **D** $(0, \frac{5}{2})$

20. The table below shows the *x*- and *y*-coordinates of some ordered pairs. Which equation describes the relationship of the *x* values to the *y* values?

x	2	3	4	5
y	8	18	32	50

F $y = 4x$

G $y = x^2 + 4$

H $y = 2x^2$

I $y = 3x + 2$

21. The Lincoln Memorial in Washington D.C. is 99 feet tall, 118 feet wide, and 188 feet long. Which fraction describes the ratio of length to width?

A $\dfrac{94}{59}$

B $\dfrac{99}{188}$

C $\dfrac{118}{99}$

D $\dfrac{118}{188}$

22. What is the *y*-intercept and the slope of the following linear equation?
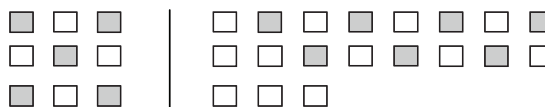$y = (\frac{1}{3}x) + 5$

F slope $= \dfrac{1}{3}$; *y*-intercept 5 = (0, 25)

G slope $= 3$; *y*-intercept 5 = (0, 5)

H slope $= \dfrac{1}{3}$; *y*-intercept 5 = (5, 0)

I slope $= \dfrac{1}{3}$; *y*-intercept 5 = (0, 5)

23. How many more shaded squares would be needed so that the ratios of white squares to shaded squares on both sides of the line would form a proportion?

A 5

B 6

C 7

D 8

24. Roberto found the length of his bedroom in feet, inches, centimeters, and meters. The number of units he found are 4.6; 15; 180; and 457. How many inches long is Roberto's bedroom?

F 4.6

G 15

H 180

I 457

Holt Mathematics Grade 7

Diagnostic Test continued

25. A flagpole casts a shadow 36 feet long. A 5.5-foot tall boy standing next to the flagpole casts a shadow 8 feet long. What is the height of the flagpole?

A 13.75 feet

B 24.75 feet

C 52.36 feet

D 162 feet

26. The capacity of the gas tank in Ms. Adler's car is 18 gallons. The table shows the distance she can drive with one tank of gas. What is the fuel efficiency of Ms. Adler's car when she is driving on the highway?

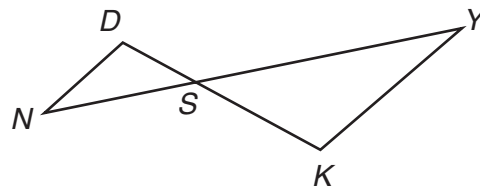| Location	Distance (in miles)
Highway	387
In town	252

F 14 miles per gallon

G 21.5 miles per gallon

H 135 miles per gallon

I 6,966 miles per gallon

27. What is the area of this rectangle in square inches?

4 ft

2 ft
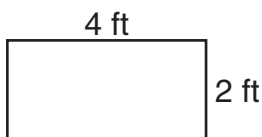
A 8 square inches

B 96 square inches

C 144 square inches

D 1,152 square inches

28. Triangles *DNS* and *KYS* are similar. Which angle has the same measure as $\angle D$?

F $\angle K$ **H** $\angle DSN$

G $\angle Y$ **I** $\angle YSK$

29. Which is the most precise measurement for the mass of an apple?

A 0.1 kilogram

B 0.14 kilogram

C 140 grams
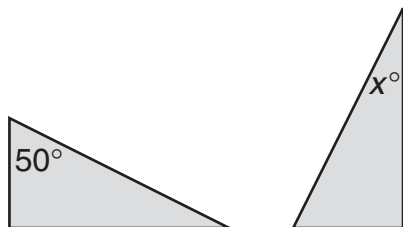
D 145 grams

30. What scale factor was used to draw the alligator?

Alligator Length

Actual	Scale Drawing
15 feet	30 inches

F $\dfrac{1}{24}$

G $\dfrac{1}{6}$

H $\dfrac{1}{12}$

I $\dfrac{1}{2}$

Holt Mathematics Grade 7

Diagnostic Test continued

31. If the two right triangles are similar, what is the measure of *x*?

  A 30°

  B 40°

  C 50°

  D 60°

32. *News of the World* magazine devotes 40 of its 128 pages to advertising. What percent of the magazine is advertising?

  F 3.3%

  G 31%

  H 31.2%

  I 31.25%

33. SmileMart has 285 televisions in stock. If they hold a sale and sell 190 of these televisions, what percent of the original number of televisions would be left?

  A 3.33%

  B 23.8%

  C $33\frac{1}{3}$%

  D $66\frac{2}{3}$%

34. What is the mean of the following data set?

1, 99, 2, 98, 3, 97, 4, 96, 5, 95

  F 47

  G 50

  H 75

  I 100

35. If data set A has a greater mean than data set B, which of the following must be true?

  A Each item in set A has a greater value than the corresponding item in set B.

  B Set A has a greater median than set B.

  C Set A has a greater mode than set B.

  D The values in set A have a greater average than the values in set B.

36. Jesse found the mass of his pet mouse in grams every Sunday. After six weeks his chart showed: 20, 22, 25, 29, 32, 34. How many times did the mouse's mass increase 2 grams from the previous week's mass?
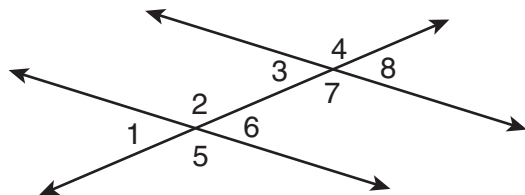
  F once

  G twice

  H three times

  I five times

Holt Mathematics Grade 7

Diagnostic Test continued

37. Which of the following would NOT be a good way to show the approximate average income in 8 different countries?
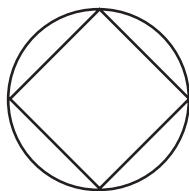
 A bar graph

 B circle graph

 C histogram

 D stem-and-leaf plot

**38.** Two of these lines are parallel. Which are a pair of corresponding angles?

 F ∠1 and ∠2   **H** ∠1 and ∠5

 G ∠1 and ∠3   **I** ∠1 and ∠6

39. The corners of the square are on the circle. What is true of the diameter of the circle and one side of the square?

 A They are congruent.

 B They are perpendicular.

 C They are both chords of the circle.

 D The diameter is shorter than the side.

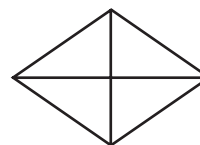**40.** Six squares intersect as shown in the figure. How many points of intersection are there?
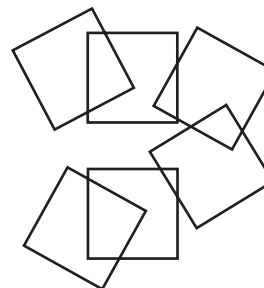
 F 6

 G 8

 H 10

 I 12

41. Which figure CANNOT have an obtuse angle?

 A equilateral triangle

 B isosceles triangle

 C regular pentagon

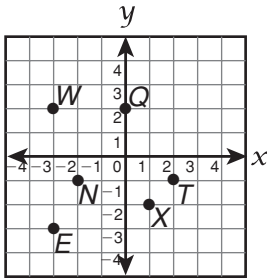 **D** regular hexagon

42. What do you *always* get if you draw one diagonal of a rhombus?

 F acute triangles

 G obtuse triangles
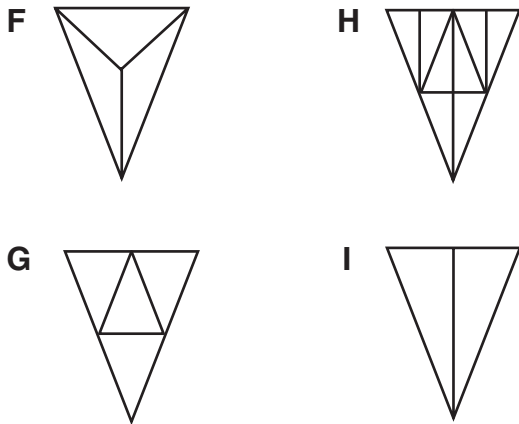
 H isosceles triangles

 I equilateral triangles

Holt Mathematics Grade 7

Diagnostic Test continued

43. Which three points are the vertices of an isosceles triangle?

- **A** Points *W, Q,* and *N*
- **B** Points *Q, X,* and *N*
- **C** Points *Q, T,* and *N*
- **D** Points *E, N,* and *X*

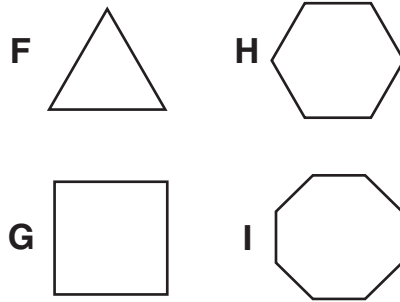**44.** Which isosoceles triangle is NOT divided into congruent parts?
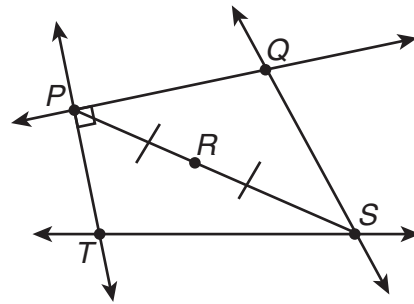

45. What types of symmetry does this design have?
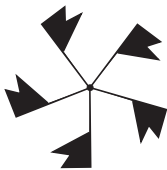
- **A** rotational symmetry
- **B** line symmetry
- **C** line and rotational symmetry
- **D** no symmetry

46. Which figure does NOT look the same after a reflection across a horizontal line?

47. Which point in the figure is a midoint?

- **A** *P*
- **B** *R*
- **C** *S*
- **D** *T*

48. What is the value of *x* in the parallelogram shown?
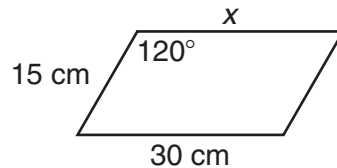
- **F** 15 centimeters
- **G** 25 centimeters
- **H** 30 centimeters
- **I** 60 centimeters

Holt Mathematics Grade 7

Diagnostic Test continued

**49.** How long is side *QR* in △*PQR*?

Q, 7 cm side, 90°, P, 24 cm, R
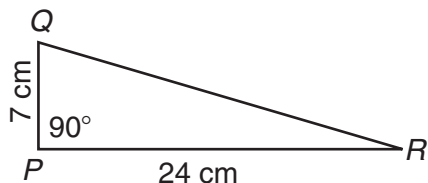
A 12.9 centimeters

B 25 centimeters

C 31 centimeters

D 35 centimeters

50. Between which two whole numbers would you find $\sqrt{183}$?

F 9 and 10

G 10 and 11

H 12 and 13

I 13 and 14

51. The bases of two cylindrical fountains have diameters of 20 yards and 24 yards. What is the difference in their area of the bases? Use 3.14 for π.

A 50.24 square yards

B 138.16 square yards

C 452.16 square yards

D 552.64 square yards

52. A round garden has a diameter of 20 feet. How much fencing is needed to go around the garden? Use 3.14 for π.

F 62.8 feet

G 314 feet

H 628 feet

I 1,256 feet

53. What is the total of the probabilities of all the events in the sample space?

A 0

B 0.5

C 1

D It depends on the experiment.

54. A rectangular gift box is 1 foot long, 8 inches wide, and 3 inches deep. What is the surface area of the box?

F 82 square inches

G 156 square inches

H 288 square inches

I 312 square inches

Holt Mathematics Grade 7

Diagnostic Test continued

55. Tanya has 3 red hats and 2 blue hats. If she picks one at random, what is the probability she will get a blue hat?

A 20%   **C** 50%

B 40%   **D** 60%

56. Which shows the top view of the model shown below?

F

G

H

I
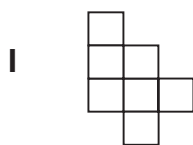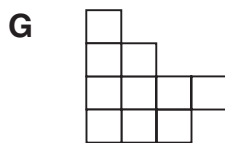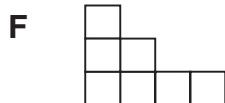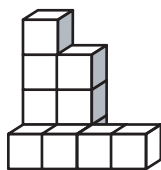
57. Which of the following is NOT the probability of getting a two on a single roll of a number cube?

A $\dfrac{1}{6}$

B 16.7%

C one out of six

D 0.15

58. Two shoes are drawn together from a box containing 10 pairs. What is the probability of getting one left shoe and one right shoe?

F $\dfrac{1}{2}$

G $\dfrac{5}{19}$

H $\dfrac{9}{10}$

I 1

59. Which of the following is a true statement about a spinner?

A All the outcomes are equally likely.

B If you spin a color, on the next spin you are more likely to land on either side of that color than on that color.

C If you spin a color, you have less chance of spinning the same color the next time.

D The spins are independent events.

60. What is the solution to the following inequality?

$$\dfrac{(4y)}{9} < -12$$

F $y = < -27$

G $y = -4\dfrac{8}{9}$

H $y = 27$

I $y > -27$

Holt Mathematics Grade 7

Grade 7 Diagnostic Test Teacher Answer Key

#	A	B	C	D
1.	A	B	C	**D**
2.	F	G	H	**I**
3.	A	B	**C**	D
4.	F	G	H	**I**
5.	A	B	C	**D**
6.	F	G	**H**	I
7.	**A**	B	C	D
8.	F	G	H	**I**
9.	A	**B**	C	D
10.	F	G	H	**I**
11.	**A**	B	C	D
12.	F	G	H	**I**
13.	A	**B**	C	D
14.	F	G	**H**	I
15.	A	**B**	C	D
16.	F	G	H	**I**
17.	A	B	**C**	D
18.	F	G	**H**	I
19.	A	B	C	**D**
20.	F	G	**H**	I
21.	**A**	B	C	D
22.	F	G	H	**I**
23.	A	B	C	**D**
24.	F	G	**H**	I
25.	A	**B**	C	D
26.	F	**G**	H	I
27.	A	B	C	**D**
28.	**F**	G	H	I
29.	A	B	C	**D**
30.	F	**G**	H	I

#	A	B	C	D
31.	A	**B**	C	D
32.	F	G	H	**I**
33.	A	B	**C**	D
34.	F	**G**	H	I
35.	A	B	C	**D**
36.	F	**G**	H	I
37.	A	B	**C**	D
38.	F	**G**	H	I
39.	A	B	**C**	D
40.	F	G	**H**	I
41.	**A**	B	C	D
42.	F	G	**H**	I
43.	A	B	**C**	D
44.	**F**	G	H	I
45.	**A**	B	C	D
46.	**F**	G	H	I
47.	A	**B**	C	D
48.	F	G	**H**	I
49.	A	**B**	C	D
50.	F	G	H	**I**
51.	A	**B**	C	D
52.	**F**	G	H	I
53	A	B	**C**	D
54.	F	G	H	**I**
55.	A	**B**	C	D
56	F	G	**H**	I
57.	A	B	C	**D**
58.	F	**G**	H	I
59.	A	B	C	**D**
60.	**F**	G	H	I

Holt Math