

Expressions, Equations, and Functions

Read each question. Then mark your answer on the sheet.

1. Which expression is equivalent to 36×209 and demonstrates the Distributive Property?
- A** $36 \times (200 \times 9)$
B $30 \times (6 + 209)$
C $36 \times (200 + 9)$
D $(30 + 6) + 209$
2. Which expression is equivalent to 57×195 and demonstrates the Distributive Property?
- A** $50 \times (7 + 195)$
B $(60 - 3) + 195$
C $57 \times (200 \times 5)$
D $57 \times (200 - 5)$
3. Solve $x - 325 = 170$.
- A** 495
B 155
C -155
D -495
4. Solve $482 = m + 158$.
- A** 640
B 324
C -324
D -640
5. Alice needs a board that is $5\frac{1}{2}$ feet long. She has a board that is $9\frac{2}{5}$ feet long. Solve the equation $c + 5\frac{1}{2} = 9\frac{2}{5}$ to determine how much Alice needs to cut, c , to get the board she needs.
- A** $14\frac{3}{7}$ feet
B $14\frac{9}{10}$ feet
C $4\frac{1}{10}$ feet
D $3\frac{9}{10}$ feet
6. Solve $\frac{5}{7}x = 2\frac{3}{4}$.
- A** $1\frac{27}{28}$
B $2\frac{1}{28}$
C $3\frac{17}{20}$
D $3\frac{13}{28}$
7. Solve $475 - 5x = 230$.
- A** 141
B 49
C -49
D -141

Expressions, Equations, and Functions

(continued)

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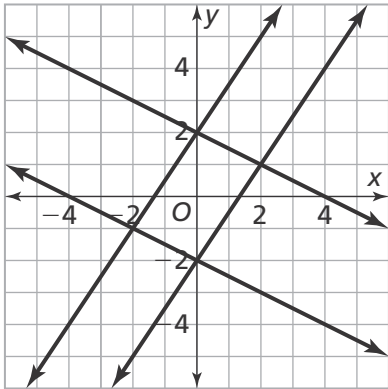
- 8.** Quentin ordered 6 tickets to a movie online for \$82.68. The price includes a \$8.10 convenience fee. Solve the equation $6p + 8.1 = 82.68$ to find the price, p , of one ticket.
- A** \$21.88
B \$15.33
C \$12.43
D \$5.68
-
- 9.** Solve $-2x + 4 - 8x = 20$.
- A** 0.25
B 4
C -1.6
D -16
-
- 10.** Solve $3x + 2(x + 2.5) = 3(3.8 + x)$
- A** 3.2
B 3.775
C 4.4
D 6.95
- 11.** How many solutions does the following system of equations have?
- $$y = 8x - 4$$
- $$y = 8x + 9$$
- A** One because the slopes are different but the y-intercepts are the same
B One because the slopes are the same but the y-intercepts are different
C Infinitely many because the slopes are the same and the y-intercepts are different
D None because the slopes are the same and the y-intercepts are different
-
- 12.** How many solutions does the following system of equations have?
- $$42x + 21y = 56$$
- $$-6x - 3y = -8$$
- A** One because the slopes are the same but the y-intercepts are different
B One because the slopes are different but the y-intercepts are the same
C Infinitely many because the slopes are the same and the y-intercepts are the same
D None because the slopes are the same and the y-intercepts are the same

Expressions, Equations, and Functions

(continued)

Read each question. Then mark your answer on the sheet.

Use the graph for Exercises 13 and 14.



- 13.** What is the solution for the following system of equations?

$$y = -0.5x + 2$$

$$y = 1.5x - 2$$

- A** (0, 2)
B (0, -2)
C (-2, -1)
D (2, 1)

- 14.** What is the solution for the following system of equations?

$$0.5x + y = -2$$

$$-5y = 2.5x - 10$$

- A** Infinitely many
B None
C (0, -2)
D (-2, -1)

- 15.** Use substitution to solve the following system of equations.

$$4y = 8x$$

$$y + 5x = 49$$

- A** $x = 7, y = 14$
B $x = 5, y = 10$
C $x = 3, y = 6$
D Infinitely many solutions

- 16.** Use substitution to solve the following system of equations.

$$x + y = 5$$

$$4x + 3y = 12$$

- A** No solutions
B $x = 2, y = 3$
C $x = -2, y = 7$
D $x = -3, y = 8$

- 17.** Use elimination to solve the following system of equations.

$$x + y = 23$$

$$4x - y = -3$$

- A** $x = -10, y = 33$
B $x = -5, y = 28$
C $x = 7, y = 16$
D $x = 4, y = 19$

Expressions, Equations, and Functions

(continued)

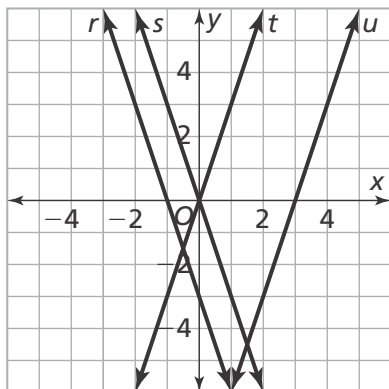
Read each question. Then mark your answer on the sheet.

- 18.** Use elimination to solve the following system of equations.

$$-3x + 4y = -14$$

$$9x - 12y = 36$$

- A** $x = 2, y = -2$
B $x = 6, y = 1$
C $x = 10, y = 4$
D No solutions
-
- 19.** Ramon graphed the equation $y = -3x - 3$. Which line did Ramon graph?



- A** Line r **C** Line t
B Line s **D** Line u
-
- 20.** What is the slope of the line that contains $(-6, 4)$ and $(18, -2)$?
- A** -4 **C** $\frac{1}{4}$
B $-\frac{1}{4}$ **D** 4

- 21.** A plane is 24,000 feet above sea level and 60 miles from the airport. It flies a straight path until it is 18,000 feet above sea level when it is 72 miles from the airport. What is the slope of the plane's path?

- A** -500 **C** 0.02
B -0.002 **D** 42.3

- 22.** The line that contains $(12, 8)$ and $(17, 11)$ also contains which point?

- A** $(-17, 11)$ **C** $(15, 13)$
B $(17, 5)$ **D** $(27, 17)$

- 23.** Which set of ordered pairs represents a function?

- A** $(12, 10), (3, -21), (-8, 0), (12, 2), (15, 3)$
B $(6, -6), (2, -15), (-4, -4), (-6, 6), (10, -19)$
C $(3, 25), (15, 12), (9, -18), (-15, 22), (3, 9)$
D $(4, 7), (7, 11), (4, 10), (9, 9), (14, 8)$

- 24.** Which equation represents a linear function?

- A** $y^2 + 5x = 45$
B $3y = 8 + 12x$
C $y = 35 + 5x^2$
D $y^2 + 2x^2 = 24$

Name _____

Expressions, Equations, and Functions

(continued)

Read each question. Then mark your answer on the sheet.

- 25.** Jamal recorded the data in the table shown. Which statement best describes his data?

Time (hour)	1	2	3	4	5	6
Sales	2	5	8	2	6	4

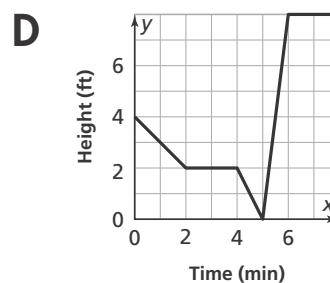
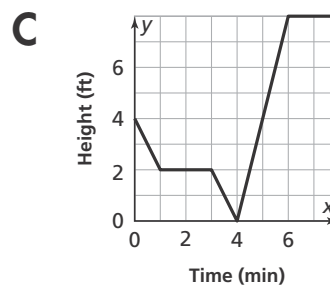
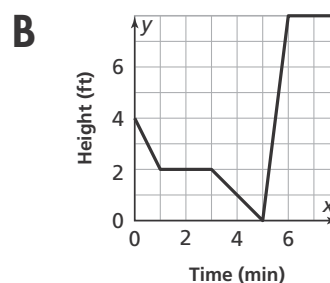
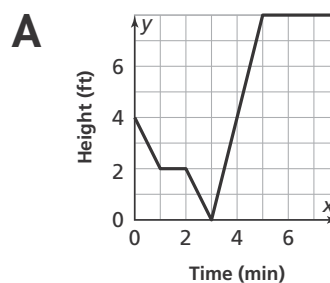
- A** The points are a relation but not a function because each time appears once, but two hours had the same number of sales.
- B** The points are neither a relation nor a function because each time is associated with only one number of sales.
- C** The points are neither a relation nor a function because each time appears once, but two hours had the same number of sales.
- D** The points are a relation and a function because each time is associated with only one number of sales.

- 26.** Which statement best describes the data in the table?

x	3	6	9	12
y	18	72	162	288

- A** Nonlinear function; The rate of change in y to x is not constant.
- B** Nonlinear function; Each x -value has only one y -value.
- C** Linear function; The x -values change by the same amount.
- D** Linear function; The rate of change in y to x is the same.

- 27.** A squirrel was 4 feet up a tree. It climbed down 2 feet in 1 minute, then stopped for 2 minutes. It climbed the rest of the way to the ground at the same pace, but upon reaching the ground, was scared by a dog and climbed up at double the pace before resting for 2 minutes. Which graph represents the squirrel's trip?



Numbers and Operations

Read each question. Then mark your answer on the sheet.

28. Which of the following shows $0.\overline{31}$ as a fraction?

- A $\frac{31}{100}$
- B $3\frac{1}{100}$
- C $\frac{31}{99}$
- D $\frac{31}{9}$

29. Which of the following shows $21\frac{177}{200}$ as a decimal?

- A $21.\overline{177}$
- B 21.177
- C $21.\overline{885}$
- D 21.885

30. Which has a value of 16?

- A $\sqrt{32}$
- B $\sqrt{196}$
- C $\sqrt{4}$
- D $\sqrt{256}$

31. Rodrigo has a square table that has an area of 676 square inches. What is the side length of the table?

- A 24
- B 26
- C 169
- D 338

32. Which has a value of 9?

- A $\sqrt[3]{999}$
- B $\sqrt[3]{729}$
- C $\sqrt[3]{81}$
- D $\sqrt[3]{27}$

33. Melanie has a fish tank in the shape of a cube that holds 343 cubic inches of water. What is the edge length of the fish tank?

- A 114 inches
- B 19 inches
- C 7 inches
- D 3 inches

34. Which expression is equivalent to $9^6 \div 9^3$?

- A $9(6-3)$
- B $9(6 \times 3)$
- C $9(6 \div 3)$
- D $9(6+3)$

35. Which expression is equivalent to $(8^8)^2$?

- A $8(8-2)$
- B $8(8+2)$
- C $8(8 \div 2)$
- D $8(8 \times 2)$

Numbers and Operations

(continued)

Read each question. Then mark your answer on the sheet.

36. Which expression is equivalent to $5^4 \times 8^4$?

- A** $(5 \times 8)^{16}$
- B** $(5 \times 8)^8$
- C** $(5 \times 8)^5$
- D** $(5 \times 8)^4$

37. Mars is on average 225,000,000 meters from Earth. What is 225,000,000 in scientific notation?

- A** 2.25×10^{-8}
- B** 2.25×10^8
- C** 22.5×10^7
- D** 22.5×10^{-7}

38. What is 0.0000357 written in scientific notation?

- A** 3.57×10^{-5}
- B** 3.57×10^5
- C** 35.7×10^{-6}
- D** 35.7×10^6

Use the table for Exercises 39 and 40.

Object	Mass (kg)
Moon	7.35×10^{22}
Earth	5.97×10^{24}

39. How many times more massive is Earth than the Moon?

- A** 8.12×10^1
- B** 4.39×10^3
- C** 8.12×10^{45}
- D** 4.39×10^{47}

40. What is the combined mass of the moon and Earth?

- A** 1.33×10^{23} kg
- B** 6.04×10^{24} kg
- C** 1.33×10^{25} kg
- D** 6.04×10^{26} kg

Fractions, Decimals, Ratios, and Proportionality

Read each question. Then mark your answer on the sheet.

Use the table for Exercises 41 and 42.

Pet	Number
Dog	3
Cat	4
Fish	16

41. What is the ratio of fish to cats?

- A** 4 to 16 **C** 16 to 23
B 16 to 4 **D** 23 to 16

42. What is the ratio of dogs to all pets?

- A** 3:20 **C** 20:3
B 23:3 **D** 3:23

43. The ratio of does to bucks in a herd of deer is $\frac{10}{3}$. What is the ratio of bucks to all deer in the herd?

- A** $\frac{3}{13}$ **C** $\frac{10}{13}$
B $\frac{13}{3}$ **D** $\frac{3}{10}$

44. A bag of 20 balloons costs \$8.60. Which bag of balloons has a proportional relationship?

- A** A bag of 25 balloons for \$10.50
B A bag of 12 balloons for \$5.16
C A bag of 40 balloons for \$18.80
D A bag of 8 balloons for \$3.92

45. Which ratio is NOT proportionally related to the other three?

- A** $x = 20.6; y = 51.5$
B $x = 11.2; y = 28$
C $x = 1.8; y = 2.7$
D $x = 6.4; y = 16$

46. Each graph is a line that passes through the origin and the point shown below. Which library charges the lowest fine per day?

- A** Library A: (1, 0.55)
B Library B: (3, 1.35)
C Library C: (4, 1.52)
D Library D: (7, 3.36)

47. The table shows how much Tonya earns babysitting. Who earns more per hour than Tonya?

Hours	2	4	6
Earnings (\$)	16	32	48

- A** Trey, whose graph passes through the origin and (1, 10)
B Rochelle, whose graph passes through (3, 21) and (5, 35)
C Jan, whose graph has the equation $y = 6.5x$
D Tuan, whose graph has the equation $y = 8x$

Name _____

Measurement, Geometry, Data Analysis, and Probability

Read each question. Then mark your answer on the sheet.

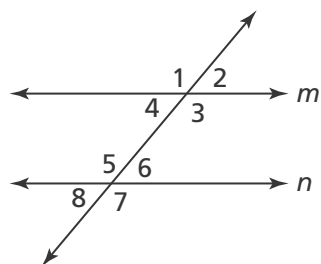
48. The hands on an analog clock that shows 5:00 form what angle?

- A** Right **C** Acute
B Straight **D** Obtuse

49. A right angle is placed next to a second right angle to form one angle. What is the new angle?

- A** Right **C** Straight
B Acute **D** Obtuse

Use the diagram for Exercises 50 and 51.



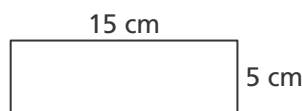
50. Let the measure of angle 4 be 62° . If the measure of angle 8 is $(2x + 2)^\circ$, what value of x would prove that line m is parallel to line n ?

- A** 78 **C** 30
B 44 **D** 13

51. Assume that lines m and n are parallel lines. Which angle is NOT supplementary to angle 4?

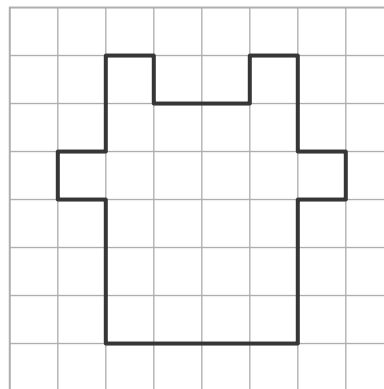
- A** Angle 2 **C** Angle 5
B Angle 3 **D** Angle 7

52. What is the perimeter of the rectangle?



- A** 75 centimeters
B 40 centimeters
C 20 centimeters
D 15 centimeters

53. Stephen drew a design for a cow's head on grid paper. What is the perimeter of his design?



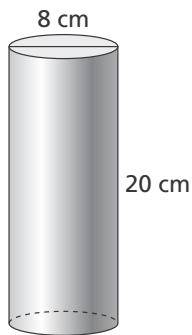
- A** 36 units
B 26 units
C 24 units
D 16 units

**Measurement, Geometry, Data Analysis,
and Probability**

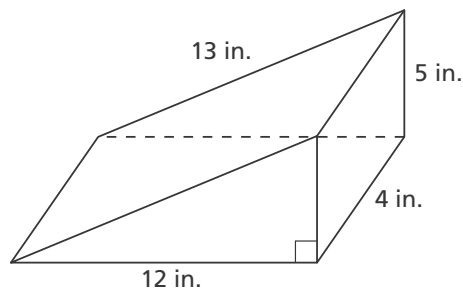
(continued)

Read each question. Then mark your answer on the sheet.

- 54.** Jason has a cylindrical metal canister. Including the lid, what is the surface area of the canister? Use 3.14 for π .



- A** 1,406.72 square centimeters
B 602.88 square centimeters
C 502.4 square centimeters
D 260.48 square centimeters
- 55.** Enrique makes a ramp for toy cars out of a block of wood in the shape of a triangular prism. What is the surface area of the prism?



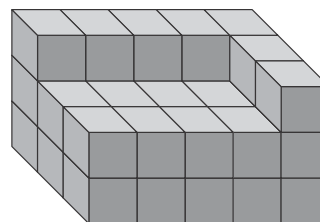
- 56.** What is the surface area of a sphere with a diameter of 16 centimeters?

- A** $1,024\pi$ square centimeters
B 256π square centimeters
C 64π square centimeters
D 32π square centimeters

- 57.** Jocelyn completely covers a plastic-foam cone with fabric. The cone is 8 inches across the base and has a slant height of 14.1 inches. Not counting overlap, how much fabric does she need to the nearest tenth of a square inch? Use 3.14 for π .

- A** 801.4 square inches
B 555.2 square inches
C 378.1 square inches
D 227.3 square inches

- 58.** Find the volume of the figure.



- A** 100 square inches
B 120 square inches
C 150 square inches
D 180 square inches
- A** 45 cubic units
B 38 cubic units
C 37 cubic units
D 24 cubic units

Name _____

**Measurement, Geometry, Data Analysis,
and Probability**

(continued)

Read each question. Then mark your answer on the sheet.

59. What is the volume of a cylinder with a base of 28.26 square inches and a height of 8 inches?

- A 3.53 cubic inches
- B 36.26 cubic inches
- C 113.04 cubic inches
- D 226.08 cubic inches

60. A cylindrical tank is 6 meters high and holds 301.44 cubic meters of water. What is the radius of the tank to the nearest whole meter? Use 3.14 for π .

- A 82 meters
- B 28 meters
- C 16 meters
- D 4 meters

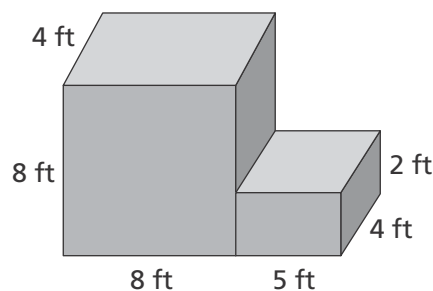
61. A sphere has a volume of 267.95 cubic units. What is the radius of the sphere to the nearest whole unit? Use 3.14 for π .

- A 4 units
- B 5 units
- C 8 units
- D 64 units

62. A soap bubble has a radius of 2 centimeters. What is the volume of the bubble to the nearest tenth of a cubic centimeter? Use 3.14 for π .

- A 100.5 cubic centimeters
- B 33.5 cubic centimeters
- C 25.1 cubic centimeters
- D 16.7 cubic centimeters

63. What is the volume of the solid figure?



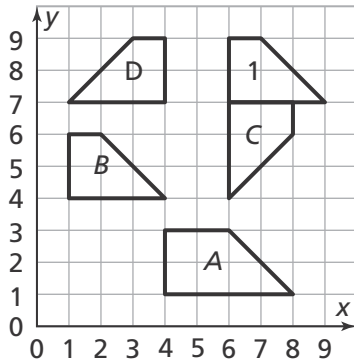
- A 256 cubic feet
- B 296 cubic feet
- C 332 cubic feet
- D 416 cubic feet

Measurement, Geometry, Data Analysis, and Probability

(continued)

Read each question. Then mark your answer on the sheet.

Use the diagram for Exercises 64 and 65.



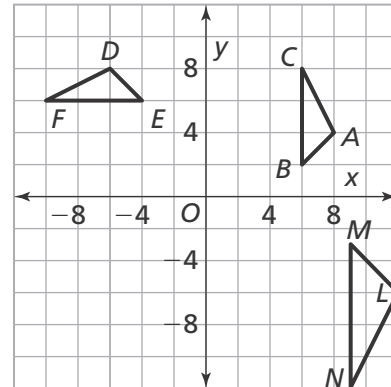
64. Which trapezoid is related to trapezoid 1 by a translation?

- A Trapezoid A
- B Trapezoid B
- C Trapezoid C
- D Trapezoid D

65. Which trapezoid is related to trapezoid 1 by a reflection?

- A Trapezoid A
- B Trapezoid B
- C Trapezoid C
- D Trapezoid D

Use the graph for Exercises 66 and 67.



66. Is $\triangle ABC$ congruent to $\triangle DEF$?

- A Yes, $\triangle ABC$ maps onto $\triangle DEF$ by a 90° counterclockwise rotation and a translation.
- B Yes, $\triangle ABC$ maps onto $\triangle DEF$ by a reflection across the x-axis and a 180° rotation.
- C No, $\triangle DEF$ points up and $\triangle ABC$ points to the right.
- D No, $\triangle DEF$ is larger than $\triangle ABC$.

67. Is $\triangle LMN$ similar to $\triangle ABC$?

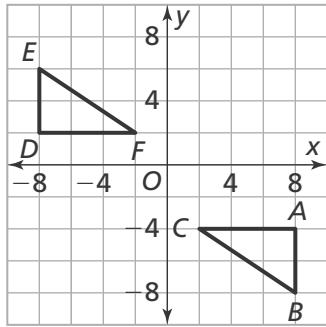
- A No, $\triangle LMN$ is larger than $\triangle ABC$.
- B No, the orientation of points L , M , and N is counterclockwise and the orientation of points A , B , and C is clockwise.
- C Yes, $\triangle ABC$ maps onto $\triangle LMN$ by a reflection over the x-axis and a dilation with a scale factor of $\frac{3}{2}$.
- D Yes, $\triangle ABC$ maps onto $\triangle LMN$ by a reflection and a dilation with a scale factor of $\frac{2}{3}$.

**Measurement, Geometry, Data Analysis,
and Probability**

(continued)

Read each question. Then mark your answer on the sheet.

- 68.** Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

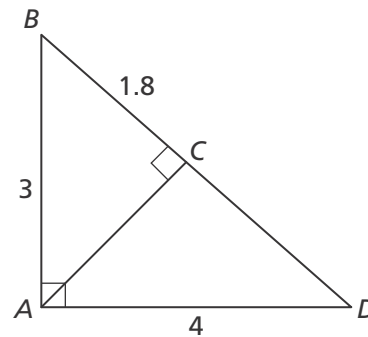


- A** Translation up 3 units, then rotation of 180° about the origin
- B** Translation to the left 10 units, then reflection across the x -axis
- C** Rotation of 90° clockwise about the origin, then reflection across the x -axis
- D** Reflection across the y -axis, then reflection across the x -axis

- 69.** If two figures are similar, what conclusion can you draw?

- A** They have the same area.
- B** Corresponding angles have different measures.
- C** Corresponding side lengths have the same ratio.
- D** They have the same orientation.

Use the diagram for Exercises 70 and 71.



- 70.** What is the length of \overline{BD} ?

- A** 25 units
- B** 5 units
- C** 3.6 units
- D** 2.6 units

- 71.** What is the length of \overline{AC} ?

- A** 5.8 units
- B** 3.5 units
- C** 2.4 units
- D** 1.1 units

**Measurement, Geometry, Data Analysis,
and Probability**

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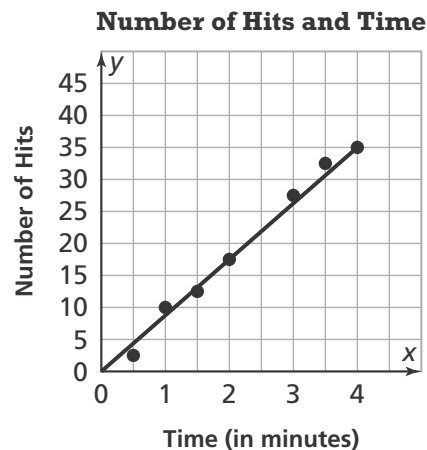
Read each question. Then mark your answer on the sheet.

- 72.** A triangle has side lengths of 16 units, 30 units, and 34 units. Is it a right triangle?
- A** No, because the ratio of 16 to 30 is not the same as that of 30 to 34.
- B** No, because 34 does not equal $16 + 30$.
- C** Yes, because 34^2 equals $16^2 + 30^2$.
- D** Yes, because 34 is greater than both 16 and 30.

- 73.** What is the distance between the points $(-5, -7)$ and $(3, 2)$ to the nearest tenth of a unit?
- A** 13.0 units
- B** 12.0 units
- C** 5.4 units
- D** 2.2 units

- 74.** Which point is located 13 units from the point $(4, 4)$?
- A** $(-8, -1)$
- B** $(9, 13)$
- C** $(7, -8)$
- D** $(17, 17)$

Use the information for Exercises 75–77. Brenda practiced at a batting cage. She had a friend count the number of times she had a good hit. Her data are shown in the scatterplot.



- 75.** What conclusion does the scatterplot support?
- A** How often she made a hit each minute was increasing.
- B** The longer she practiced, the higher the number of hits.
- C** The more often she practiced, the more hits she got.
- D** She did not get a hit from 2 minutes to 3 minutes.
- 76.** Based on the scatterplot, about how many times did Brenda get a hit within the first 2.5 minutes?
- A** 16 **C** 35
- B** 22 **D** 45

Name _____

**Measurement, Geometry, Data Analysis,
and Probability**

(continued)

Read each question. Then mark your answer on the sheet.

- 77.** Brenda models the number of hits using the equation $y = \frac{17}{2}x$. She practiced for 10 minutes. Based on the equation, about how many hits will Brenda get?

A 50 **C** 85
B 70 **D** 170

Use the information for Exercises 78 and 79.

The table shows the results of a survey of whether students prefer creamy peanut butter or crunchy peanut butter.

		Gender		
		Boys	Girls	Total
Peanut Butter	Creamy	79		237
	Crunchy	61	22	83
	Total	140	180	320

- 78.** How should the number of girls who preferred creamy peanut butter be determined?

A $140 + 61$
B $180 + 22$
C $320 - 22$
D $237 - 79$

- 79.** Which conclusion can be drawn from the data?

A More girls prefer crunchy to creamy.
B About three times as many boys as girls prefer crunchy.
C More than half of the boys prefer crunchy.
D The number of girls surveyed is about twice the number of boys surveyed.

**Measurement, Geometry, Data Analysis,
and Probability**

(continued)

Read each question. Then mark your answer on the sheet.

- 80.** The table shows the results of a survey of whether people prefer hot cocoa with or without marshmallows based on their age. Which statement is supported by the data?

		People		
		Youths	Adults	Total
Marshmallows	Yes	25%	49%	74%
	No	7%	19%	26%
	Total	32%	68%	100%

- A** Roughly the same number of people prefers marshmallows as prefers no marshmallows.
- B** Only 19% of the adults surveyed prefer marshmallows.
- C** About one-third of the people surveyed were youths.
- D** One-fourth of the youths prefers marshmallows.