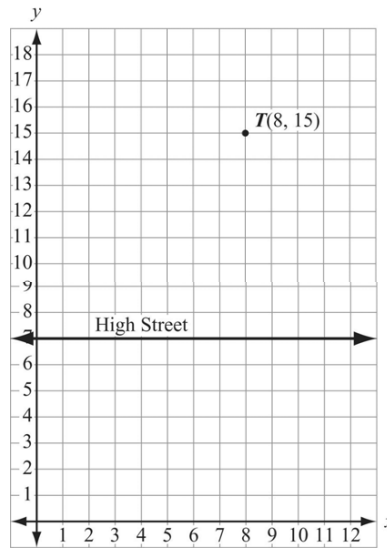
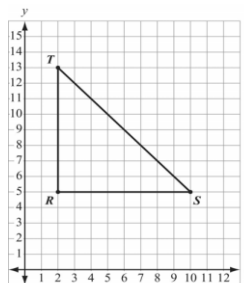


- The vertices of quadrilateral  $EFGH$  have the coordinates  $E (2, -2)$ ,  $F (4, 3)$ ,  $G (-1, 5)$ , and  $H (-3, 0)$ . Which of the following describes quadrilateral  $EFGH$ ?
  - a square
  - a rectangle that is not a square
  - a rhombus that is not a square
  - a parallelogram that is not a rectangle
  
- In Isosceles  $\triangle PQR$ ,  $PQ \cong PR$ . Point  $P$  is located at  $(1, 1)$ . The centroid of the triangle is located at  $(6, 2)$ . Which coordinate pair could represent the location of point  $R$  of the triangle?
  - $(1, 4)$
  - $(5, 1)$
  - $(7, 3)$
  - $(11, 1)$

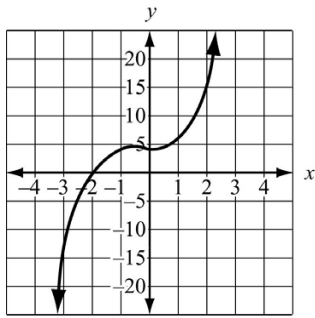
- Wesley is walking with his dog along High Street. He wants to go from High Street to his house located at point  $T$  on this grid. Once Wesley leaves High Street, he will have to walk across a rocky field. His dog refuses to walk across the field, so Wesley will have to carry him. At what point on High Street should Wesley turn and walk toward his house so that he carries his dog the shortest possible distance?
  - $(0, 7)$
  - $(7, 7)$
  - $(8, 7)$
  - $(10, 7)$



- On this coordinate grid, the library is located at point  $T$ , the music store is located at point  $S$ , and the pet store is located at point  $R$ . Each grid line represents 1 mile. How much farther, to the nearest tenth of a mile, is the music store from the library than it is from the pet store?
  - 3.3 miles
  - 8.0 miles
  - 11.3 miles
  - 13.6 miles



5. The graph of the function  $f(x) = x^3 + x^2 + 4$  is shown on this coordinate plane. Which statement best describes the behavior of the function within the interval  $x = -3$  to  $x = 0$ ?



- A. From left to right, the function rises only.  
 B. From left to right, the function falls and then rises.  
 C. From left to right, the function rises and then falls.  
 D. From left to right the function falls, rises, and then falls.
6. The base of a triangle is represented by  $\sqrt{x}$  inches. The height is 4 inches. The area of the triangle is 18 square inches. What is the value of  $x$ ?
- A. 9  
 B. 18  
 C. 36  
 D. 81
7. What is the formula for the function with a graph the same as the graph obtained by reflecting the graph of  $y = \sqrt{-x}$  across the  $x$ -axis?
- A.  $y = -\sqrt{-x}$   
 B.  $y = -\sqrt{x}$   
 C.  $y = \sqrt{-x}$   
 D.  $y = \sqrt{x}$
8. The equation  $\sqrt{3x+4} = 5$  compares the areas of two congruent triangles. What is the value of  $x$ ?
- A. 1  
 B. 3  
 C. 7  
 D. 25
9. Breanna is rowing a boat at a rate of 5 miles per hour. She can row 7 miles downstream, with the current, in the same amount of time it takes her to row 3 miles upstream, against the current. This equation can be used to find the speed of the current in the stream.

$$\frac{7}{5+c} = \frac{3}{5-c}$$

What is the speed of the current in the stream?

- A. 2 miles per hour  
 B. 3 miles per hour  
 C. 4 miles per hour  
 D. 5 miles per hour

10. A squirrel in a tree dropped an acorn 48 feet to the ground. The number of seconds,  $t$ , it took the acorn to reach the ground is modeled by this equation.

$$-16t^2 + 48 = 0$$

How many seconds did it take the acorn to reach the ground?

- A.  $\sqrt{3}$
- B. 3
- C.  $\sqrt{32}$
- D. 32

11. What value of  $x$  makes this equation true?

$$\frac{4}{x} + \frac{1}{2x} = 8$$

- A.  $\frac{5}{24}$
- B.  $\frac{9}{16}$
- C.  $\frac{5}{8}$
- D.  $\frac{4}{5}$

12. This table shows the scores of four students on their first four mathematics quizzes.

Student	Quiz Scores	Mean Score
Anna	80, 90, 75, 75	80
Jim	100, 70, 80, 70	80
Stacy	92, 78, 68, 82	80
Ted	71, 84, 84, 81	80

Which student had the least mean absolute deviation on the quiz scores?

- A. Anna
- B. Jim
- C. Stacy
- D. Ted

13. The heights in inches of five girls in an exercise class were 66, 64, 68, 70, and 65. A sixth girl joined the class. The mean height of the six girls in the class was 66 inches and the mean absolute deviation was 2 inches. What was the height of the sixth girl who joined the class?

- A. 63 inches
- B. 64 inches
- C. 65 inches
- D. 66 inches

14. This table shows the average high temperature, in  $^{\circ}F$ , recorded in Atlanta, GA, and Austin, TX, over a six-day period.

Day	1	2	3	4	5	6
Temp in Atlanta, GA	85	88	83	79	81	85
Temp in Austin, TX	80	86	82	80	93	89

Which conclusion can be drawn from the data?

- A. The median temperature over the six-day period was the same for both cities, but the interquartile range for Austin is greater than Atlanta.
- B. The mean temperature of Atlanta was higher than the mean temperature of Austin, and the interquartile range is greater for Atlanta than Austin.
- C. The mean temperature of Austin was higher than the mean temperature of Atlanta, but the median temperature of Austin was lower.
- D. The mean and median temperatures of Atlanta were higher than the mean and median temperatures of Austin.
15. A school was having a canned food drive for a local food bank. A teacher determined the median number of cans collected per class and the interquartile ranges of the number of cans collected per class for the juniors and for the seniors.
- The juniors collected a mean number of cans per class of 35, and the interquartile range was 10.
  - The seniors collected a mean number of cans per class of 40, and the interquartile range was 8.
  - Both the juniors and the seniors had the same third quartile number of cans collected.

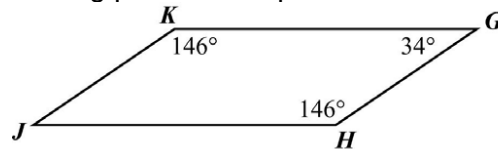
Which range includes only the numbers that could be the third quartile number of cans collected for both classes?

- A. 25 to 45
- B. 25 to 48
- C. 32 to 48
- D. 40 to 45
16. A teacher has 9 red crayons, 4 blue crayons, 7 purple crayons, and 5 black crayons in a basket. A student reaches into the basket and randomly selects a crayon. What is the probability that the crayon will be either blue or black?
- A.  $\frac{4}{16}$
- B.  $\frac{9}{25}$
- C.  $\frac{13}{25}$
- D.  $\frac{9}{16}$

17. There are 6 red apples, 4 yellow apples, and 2 green apples in a bucket. Maria will choose two apples at random without replacement. What is the probability that Maria will choose a red apple and then a green apple?

- A.  $\frac{5}{121}$
- B.  $\frac{6}{121}$
- C.  $\frac{1}{11}$
- D.  $\frac{1}{12}$

18. Which of the following proves that quadrilateral  $GHJK$  is a parallelogram?



- A.  $\angle G$  is supplementary to  $\angle H$  and  $\angle K$
- B.  $\angle J$  is complimentary to  $\angle G$
- C.  $GH \perp HJ$  and  $JK \perp KG$
- D.  $GH \cong HJ \cong JK \cong KG$

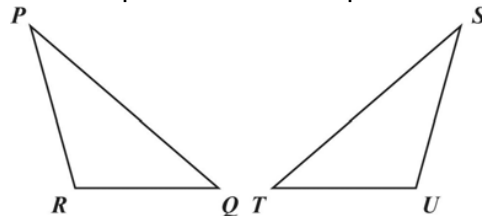
19. A student wants to inscribe a circle inside a triangle. Which of the following should the student construct to locate the incenter of the triangle?

- A. the medians of the triangle
- B. the altitudes of the triangle
- C. the angle bisectors of the triangle
- D. the perpendicular bisectors of the sides of the triangle

20. Jay constructed a line segment from each vertex that was perpendicular to the line containing the opposite side of a triangle. At what point of concurrency did the lines meet?

- A. the incenter
- B. the centroid
- C. the orthocenter
- D. the circumcenter

21. Which set of relationships is sufficient to prove that the triangles in this figure are congruent?



- A.  $PR \cong SU$ ,  $PQ \cong ST$ ,  $\angle Q \cong \angle U$
- B.  $PQ \cong PR$ ,  $ST \cong SU$ ,  $RQ \cong TU$
- C.  $RQ \cong TU$ ,  $\angle R \cong \angle U$ ,  $\angle P \cong \angle S$
- D.  $\angle P \cong \angle S$ ,  $\angle R \cong \angle U$ ,  $\angle Q \cong \angle T$

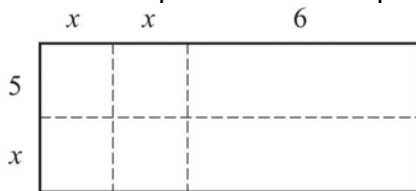
22. Which sets could be the lengths of the sides of the triangle?

- A. 15 cm, 18 cm, 26 cm
- B. 16 cm, 16 cm, 32 cm
- C. 17 cm, 20 cm, 40 cm
- D. 18 cm, 22 cm, 42 cm

23. Which expression represents the area of rectangle given that the length is  $\frac{4d-12}{d^2-9}$  and the width is  $3d+3$ ?

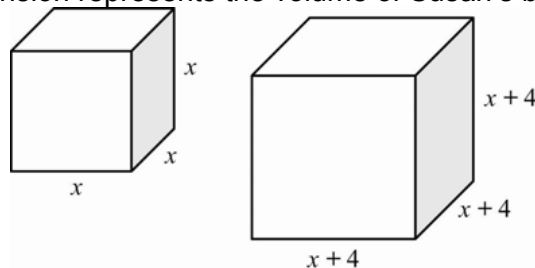
- A. 7
- B. 12
- C.  $\frac{4}{3d+3^2}$
- D.  $\frac{7d-3}{d^2-9}$

24. What is the product of the expression represented by the model below?



- A.  $3x+11$
- B.  $x^3+30$
- C.  $2x^2+10x+36$
- D.  $2x^2+16x+30$

25. Taylor and Susan each have a box that is in the shape of a cube. The edges of Taylor's box are each  $x$  cm in length. The edges of Susan's box are 4 cm longer than on Taylor's cube. What is binomial expansion represents the volume of Susan's box?



- A.  $x^2+8x+16 \text{ cm}$
- B.  $x^3+12x^2+48x+64 \text{ cm}$
- C.  $x^3+768x^2+192x+4 \text{ cm}$
- D.  $x^4+12x^3+96x^2+256x+256 \text{ cm}$