1. Simplify the expression by using the quotient rule for square roots. $\sqrt{\frac{11}{9}}$

A. $\frac{3}{\sqrt{11}}$

B. $\frac{11}{\sqrt{3}}$

C. $\frac{\sqrt{3}}{11}$

D. $\frac{11\sqrt{3}}{3}$

E. $\frac{\sqrt{11}}{3}$

F. $\frac{11}{3}$

G. $\frac{3}{11}$

H. $\frac{3\sqrt{11}}{11}$

2. Simplify the expression by rationalizing the denominator. $\frac{\sqrt{19}}{\sqrt{13}}$

A. $\frac{19}{13\sqrt{19}}$

B. $\frac{19}{13}$

C. $\frac{13}{19}$

D. $\frac{19\sqrt{13}}{13}$

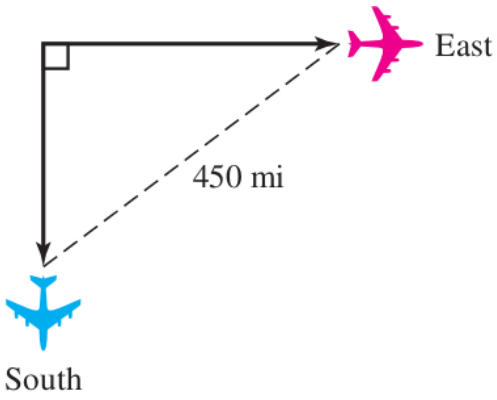
E. $\frac{13}{19\sqrt{13}}$

F. $\frac{19\sqrt{19}}{13}$

G. $\frac{\sqrt{247}}{19}$

H. $\frac{\sqrt{247}}{13}$

3. Two airplanes depart simultaneously from an airport. One flies due south; the other flies due east at a rate 29 mi/h faster than that of the first airplane. After 3 hours, radar indicates that the airplanes are 450 mi apart. What is the ground speed of each airplane? Round your answer to the nearest tenth.



A. The the ground speed of the plane heading south is 90.4 miles per hour and the ground speed of the plane heading east is 112.6 miles per hour.

B. The the ground speed of the plane heading south is 89.7 miles per hour and the ground speed of the plane heading east is 117.6 miles per hour.

C. The the ground speed of the plane heading south is 90.7 miles per hour and the ground speed of the plane heading east is 111.6 miles per hour.

D. The the ground speed of the plane heading south is 90.6 miles per hour and the ground speed of the plane heading east is 119.6 miles per hour.

E. The the ground speed of the plane heading south is 91.4 miles per hour and the ground speed of the plane heading east is 116.6 miles per hour.

F. The the ground speed of the plane heading south is 91.5 miles per hour and the ground speed of the plane heading east is 113.6 miles per hour.

G. The the ground speed of the plane heading south is 90.5 miles per hour and the ground speed of the plane heading east is 118.6 miles per hour.

H. The the ground speed of the plane heading south is 90 miles per hour and the ground speed of the plane heading east is 115.6 miles per hour.

4. Which equation would you solve in order to find two consecutive even integers whose product is 288?

A. You would solve the equation $x^2 - x - 288 = 0$.

B. You would solve the equation $x^2 - 2x + 288 = 0$.

C. You would solve the equation $x^2 + x - 144 = 0$.

D. You would solve the equation $x^2 + 2x - 288 = 0$.

E. You would solve the equation $x^2 + x - 288 = 0$.

F. You would solve the equation $x^2 + x + 144 = 0$.

G. You would solve the equation $x^2 - x - 144 = 0$.

H. You would solve the equation $x^2 - x + 144 = 0$.

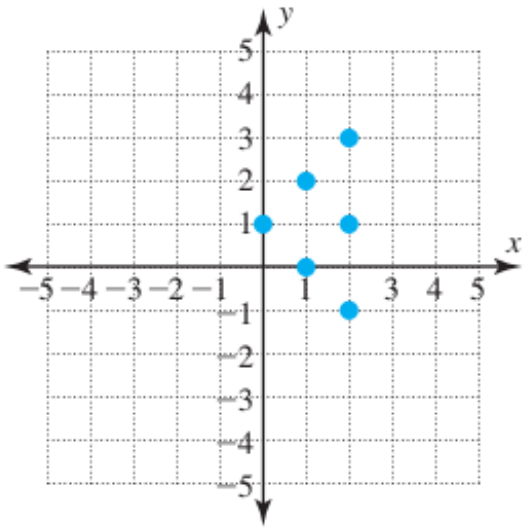
5. Use the table to answer the question: Is 3 an input value or an output value?

x	y
-1	1
2	3
5	5
8	7

A. 3 is an input value.

B. 3 is an output value.

6. Use the vertical line test to determine whether each graph represents a function. If it is a function, identify the domain and range.



A. The relation is a function with domain $D = \{1, 2, 3\}$ and range $R = \{-1, 0, 1, 2, 3\}$.

B. The relation is a function with domain $D = \{-1, 0, 1, 2, 3\}$ and range $R = \{1, 2, 3\}$.

C. The relation is a function with domain $D = \{0, 1, 2\}$ and range $R = \{-1, 0, 1, 2, 3\}$.

D. The relation is a function with domain $D = \{-1, 0, 1, 2, 3\}$ and range $R = \{0, 1, 2\}$.

E. The relation is not a function.

7. Find the interval(s) where the absolute value function $f(x) = -2|x + 2| + 3$ is positive.

A. The function $f(x)$ is positive on $(-\infty, -0.5) \cup (-3.5, \infty)$

B. The function $f(x)$ is positive on $\mathbb{R}$.

C. The function $f(x)$ is positive on $(-3.5, -0.5)$

D. The function $f(x)$ is positive on $(-0.5, -3.5)$

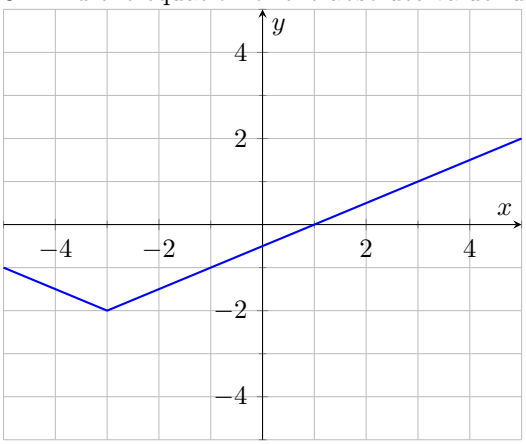
E. The function $f(x)$ is positive on $(-0.5, 0) \cup (-3.5, 0)$

F. The function $f(x)$ is positive on $(-\infty, -3.5) \cup (-0.5, \infty)$

G. The function $f(x)$ is positive on $(0, -1)$.

H. The function $f(x)$ is positive on $(0, -0.5) \cup (0, -3.5)$

8. Find the equation of the absolute value function $f(x)$ graphed below.



A. $f(x) = -3|x - 1| - 2$

B. $f(x) = -0.5|x - 4| - 2$

C. $f(x) = -2|x - 3| + 1$

D. $f(x) = 2|x - 2| - 2$

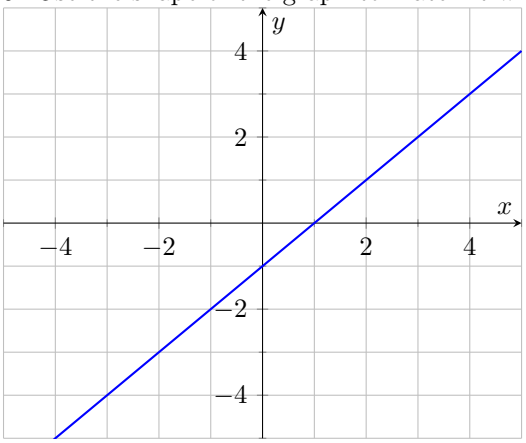
E. $f(x) = 0.5|x + 3| - 2$

F. $f(x) = -|x - 3| + 4$

G. $f(x) = 3|x| - 2$

H. $f(x) = |x - 3| - 4$

9. Use the shape of the graph to match it with the function that defines this graph.



A. $f(x) = 2x - 1$

B. $f(x) = x - 1$

C. $f(x) = 3x^2 + x - 1$

D. $f(x) = -3x^2 + x - 1$

10. The height of a baseball is given by $h(t) = -16t^2 + 60t + 15$, where $h(t)$ represents the height of the ball in feet and t is the number of seconds that have elapsed since the ball was released. Determine the highest point that the ball reaches. Determine how many seconds into the flight the maximum height is reached.

A. The baseball will reach its maximum height of 70.25 feet after 0.125 seconds.

B. The baseball will reach its maximum height of 72.25 feet after 0.125 seconds.

C. The baseball will reach its maximum height of 71.25 feet after 1.875 seconds.

D. The baseball will reach its maximum height of 66.25 feet after 0.125 seconds.

E. The baseball will reach its maximum height of 74.25 feet after 1.875 seconds.

F. The baseball will reach its maximum height of 73.25 feet after 1.875 seconds.

G. The baseball will reach its maximum height of 68.25 feet after 1.875 seconds.

H. The baseball will reach its maximum height of 75.25 feet after 0.125 seconds.

11. Determine the slope and y-intercept of the line $f(x) = -4$.

A. The slope is 0 and the y-intercept is $(0, -4)$.

B. The y-intercept is undefined.

C. The slope is undefined.

D. The slope is $(0, -4)$ and the y-intercept is 0.

E. The y-intercept is undefined, but the y-intercept is 0.

F. Both the slope and the y-intercept are undefined.

G. The slope is undefined, but the y-intercept is $(0, -4)$.

H. There is not enough information to determine the slope and y-intercept.

12. Find the x and y-intercept of the line $4x + 2y = -7$.

A. The x-intercept is $(-3.5, -1.75)$ and the y-intercept is $(-1.75, -3.5)$.

B. The x-intercept is $(-3.5, 0)$ and the y-intercept is $(0, -1.75)$.

C. The x-intercept is $(0, -1.75)$ and the y-intercept is $(0, -3.5)$.

D. The x-intercept is $(-1.75, 0)$ and the y-intercept is $(0, -3.5)$.

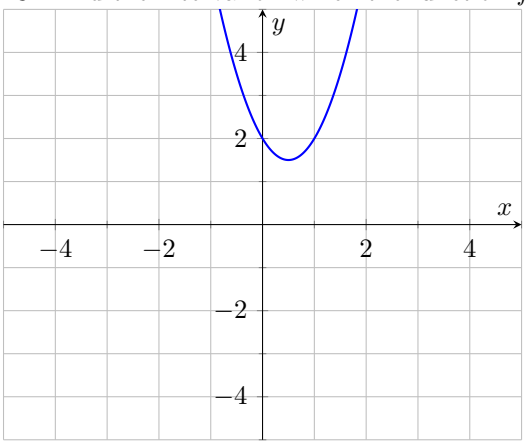
E. The x-intercept is $(-1.75, 0)$ and the y-intercept is $(-3.5, 0)$.

F. The x-intercept is $(-1.75, -3.5)$ and the y-intercept is $(-3.5, -1.75)$.

G. The x-intercept is $(0, -3.5)$ and the y-intercept is $(-1.75, 0)$.

H. The x-intercept is $(0, -1.75)$ and the y-intercept is $(-3.5, 0)$.

13. Find the interval on which the function $f(x)$ graphed below is increasing.



A. The function $f(x)$ is increasing on $(0.5, \infty)$.

B. The function $f(x)$ is increasing on $\mathbb{R}$.

C. The function $f(x)$ is increasing on $(-0.5, \infty)$.

D. The function $f(x)$ is increasing on $(-\infty, 3) \cup (1, \infty)$.

E. The function $f(x)$ is increasing on $(-\infty, -0.5)$.

F. The function $f(x)$ is increasing on $(-\infty, 0.5)$.

G. The function $f(x)$ is increasing on $(-\infty, 1) \cup (3, \infty)$.

H. The function $f(x)$ is increasing on $(1, 3)$.

14. Find the interval on which the absolute value function $f(x) = 0.5|x + 2| - 4$ is increasing.

A. The function $f(x)$ is increasing on $(-\infty, 2)$.

B. The function $f(x)$ is increasing on $(-\infty, -2)$.

C. The function $f(x)$ is increasing on $(-\infty, -10) \cup (6, \infty)$

D. The function $f(x)$ is increasing on $(-2, \infty)$.

E. The function $f(x)$ is increasing on $(2, \infty)$.

F. The function $f(x)$ is increasing on $(6, -10)$

G. The function $f(x)$ is increasing on $(-\infty, 6) \cup (-10, \infty)$

H. The function $f(x)$ is increasing on $(-10, 6)$

15. Complete the square by filling in the missing number. $x^2 - 14x + \_\_\_\_\_$

A. -9

B. 9

C. $-\frac{169}{4}$

D. $-\frac{9}{4}$

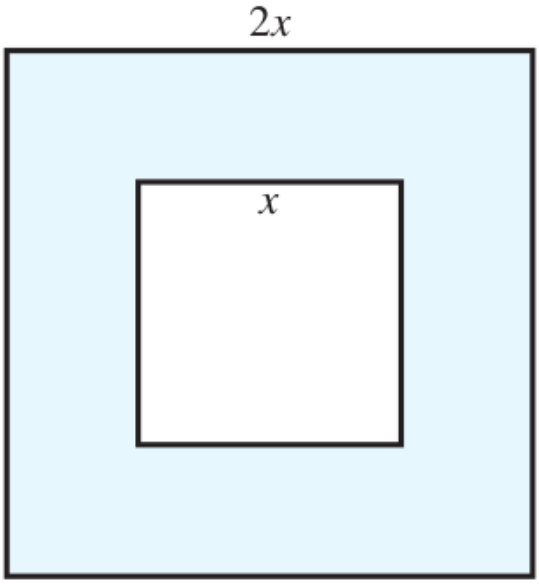
E. $\frac{169}{4}$

F. 49

G. -49

H. $\frac{9}{4}$

16. **Framing a Print** A square print is surrounded by a mat and then framed. The width of the square mat is twice that of the print. If the area covered by the mat is 243 in^2, determine the width of the print.



A. The width of the print is 13 in.

B. The width of the print is 10 in.

C. The width of the print is 11 in.

D. The width of the print is 9 in.

E. The width of the print is 3 in.

F. The width of the print is 12 in.

G. The width of the print is 4 in.

H. The width of the print is 7 in.

17. Solve the quadratic equation by completing the square. (Don't simplify the radical expression.)

$$5w^2 - 8w - 9 = 0$$

A. $w = \frac{4}{5} \pm \sqrt{\frac{369}{256}}$

B. $w = -\frac{4}{5} \pm \sqrt{\frac{81}{16}}$

C. $w = -\frac{4}{5} \pm \sqrt{\frac{17}{16}}$

D. $w = -\frac{4}{5} \pm \sqrt{\frac{43}{36}}$

E. $w = \frac{4}{5} \pm \sqrt{\frac{61}{25}}$

F. $w = -\frac{4}{5} \pm \sqrt{\frac{18}{49}}$

G. $w = \frac{4}{5} \pm \sqrt{\frac{58}{81}}$

H. $w = \frac{4}{5} \pm \sqrt{\frac{25}{36}}$

18. Use the quadratic formula to solve the quadratic equation. Leave the radical unsimplified.

$$2b^2 - 7b + 1 = 0$$

A. $b = \frac{-7 \pm \sqrt{76}}{4}$

B. $b = \frac{-7 \pm \sqrt{121}}{4}$

C. This equation has no real number solutions.

D. $b = \frac{7 \pm \sqrt{24}}{4}$

E. $b = \frac{7 \pm \sqrt{33}}{4}$

F. $b = \frac{7 \pm \sqrt{41}}{4}$

G. $b = \frac{-7 \pm \sqrt{76}}{-4}$

H. $b = \frac{-7 \pm \sqrt{41}}{4}$

19. Use the quadratic formula to solve the quadratic equation. Leave the radical unsimplified.

$$9b^2 = -3b + 5$$

A. $b = \frac{-3 \pm \sqrt{189}}{18}$

B. $b = \frac{-3 \pm \sqrt{236}}{-18}$

C. $b = \frac{-3 \pm \sqrt{29}}{18}$

D. This equation has no real number solutions.

E. $b = \frac{-3 \pm \sqrt{33}}{18}$

F. $b = \frac{3 \pm \sqrt{81}}{18}$

G. $b = \frac{3 \pm \sqrt{56}}{18}$

H. $b = \frac{-3 \pm \sqrt{33}}{-18}$

20. Solve the quadratic equation and completely simplify your answer.

$$v^2 - 4v + 1 = 0$$

A. $v = 2 \pm 6$

B. $v = 2 \pm \sqrt{15}$

C. $v = 2 \pm \sqrt{3}$

D. $v = 2 \pm \sqrt{5}$

E. $v = 2 \pm 6\sqrt{5}$

F. $v = 2 \pm 2\sqrt{15}$

G. $v = 2 \pm \sqrt{30}$

H. $v = 2 \pm \sqrt{10}$

Answers

1. E.
2. H.
3. D.
4. D.
5. B.
6. E.
7. C.
8. E.
9. B.
10. C.
11. A.
12. D.
13. A.
14. D.
15. F.
16. D.
17. E.
18. F.
19. A.
20. C.