1. Solve the quadratic equation by using extraction of roots to obtain exact solutions. $7y^2 - 490 = 0$

A. $y = \pm 5\sqrt{3}$

B. $y = \pm 6\sqrt{3}$

C. $y = \pm 2\sqrt{10}$

D. $y = \pm 30\sqrt{3}$

E. $y = \pm\sqrt{70}$

F. $y = \pm 3\sqrt{110}$

G. $y = \pm\sqrt{165}$

H. $y = \pm 6\sqrt{14}$

2. Simplify the expression by using the quotient rule for square roots. $\frac{\sqrt{17}}{\sqrt{68}}$

A. $\frac{17}{\sqrt{2}}$

B. $\frac{\sqrt{17}}{2}$

C. $\frac{17\sqrt{2}}{2}$

D. $\frac{1}{2}$

E. 2

F. $\frac{2}{17}$

G. $\frac{\sqrt{2}}{17}$

H. $\frac{2\sqrt{17}}{17}$

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

$$z^2 - 5z - 13 = 0$$

A. $z = \frac{5}{2} \pm \sqrt{\frac{137}{4}}$

B. $z = -\frac{5}{2} \pm \sqrt{\frac{121}{4}}$

C. $z = -\frac{5}{2} \pm \sqrt{40}$

D. $z = \frac{5}{2} \pm \sqrt{13}$

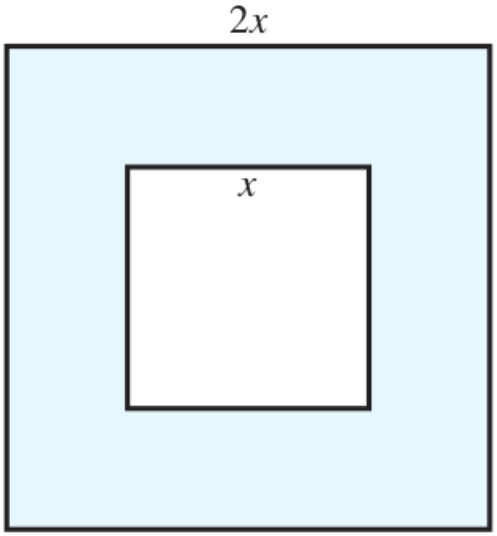
E. $z = -\frac{5}{2} \pm \sqrt{\frac{233}{4}}$

F. $z = -\frac{5}{2} \pm \sqrt{4}$

G. $z = \frac{5}{2} \pm \sqrt{\frac{77}{4}}$

H. $z = \frac{5}{2} \pm \sqrt{\frac{213}{4}}$

4. 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 108 $in^2$, determine the width of the print.




A. The width of the print is 6 in.

B. The width of the print is 7 in.

C. The width of the print is 11 in.

D. The width of the print is 5 in.

E. The width of the print is 3 in.

F. The width of the print is 10 in.

G. The width of the print is 8 in.

H. The width of the print is 14 in.

5. Solve the quadratic equation and completely simplify your answer. $9\alpha^2 - 24\alpha + 4 = 0$

A. $\alpha = \frac{4 \pm 2}{3}$

B. $\alpha = \frac{4 \pm \sqrt{15}}{3}$

C. $\alpha = \frac{4 \pm \sqrt{10}}{3}$

D. $\alpha = \frac{4 \pm 6\sqrt{5}}{3}$

E. $\alpha = \frac{4 \pm \sqrt{30}}{3}$

F. $\alpha = \frac{1 \pm \sqrt{15}}{3}$

G. $\alpha = \frac{4 \pm 3\sqrt{5}}{3}$

H. $\alpha = \frac{4 \pm 2\sqrt{3}}{3}$

6. Solve the quadratic equation and completely simplify your answer. $4s^2 - 12s - 36 = 0$

A. $s = \frac{3 \pm \sqrt{15}}{2}$

B. $s = \frac{3 \pm 2\sqrt{3}}{2}$

C. $s = \frac{3 \pm \sqrt{10}}{2}$

D. $s = \frac{3 \pm 2\sqrt{5}}{2}$

E. $s = \frac{3 \pm \sqrt{30}}{2}$

F. $s = \frac{3 \pm 6\sqrt{5}}{2}$

G. $s = \frac{3 \pm 3\sqrt{5}}{2}$

H. $s = \frac{3 \pm \sqrt{3}}{2}$

7. The size of a computer monitor is usually given as the length of a diagonal of the screen. A new computer comes with a 17-in monitor (diagonal length). Give the height of the screen if the width is 9 in. Round your answer to the nearest tenth.

A. The height of the screen is about 14.9 inches.

B. The height of the screen is about 15.1 inches.

C. The height of the screen is about 15.2 inches.

D. The height of the screen is about 13.8 inches.

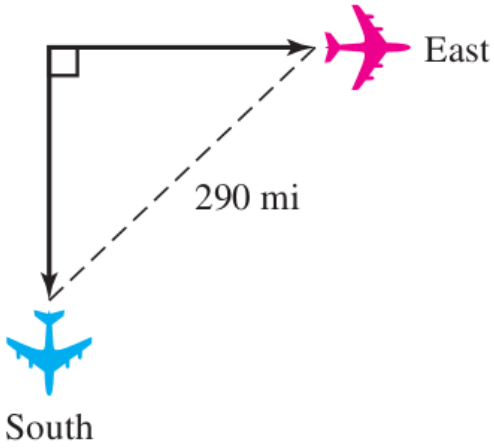
E. The height of the screen is about 13.6 inches.

F. The height of the screen is about 14.2 inches.

G. The height of the screen is about 14.4 inches.

H. The height of the screen is about 14 inches.

8. Two airplanes depart simultaneously from an airport. One flies due south; the other flies due east at a rate 17 mi/h faster than that of the first airplane. After 1 hour, radar indicates that the airplanes are 290 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 197 miles per hour and the ground speed of the plane heading east is 211.4 miles per hour.

B. The the ground speed of the plane heading south is 197.1 miles per hour and the ground speed of the plane heading east is 212.4 miles per hour.

C. The the ground speed of the plane heading south is 195.7 miles per hour and the ground speed of the plane heading east is 206.4 miles per hour.

D. The the ground speed of the plane heading south is 196.4 miles per hour and the ground speed of the plane heading east is 213.4 miles per hour.

E. The the ground speed of the plane heading south is 196.6 miles per hour and the ground speed of the plane heading east is 208.4 miles per hour.

F. The the ground speed of the plane heading south is 196 miles per hour and the ground speed of the plane heading east is 215.4 miles per hour.

G. The the ground speed of the plane heading south is 196.3 miles per hour and the ground speed of the plane heading east is 210.4 miles per hour.

H. The the ground speed of the plane heading south is 196.8 miles per hour and the ground speed of the plane heading east is 216.4 miles per hour.

9. Given $f(x) = -|x - 5| + 7$, evaluate the expression $f(4)$.

A. $f(4) = -3$.

B. $f(4) = 15$.

C. $f(4) = 11$.

D. $f(4) = 9$.

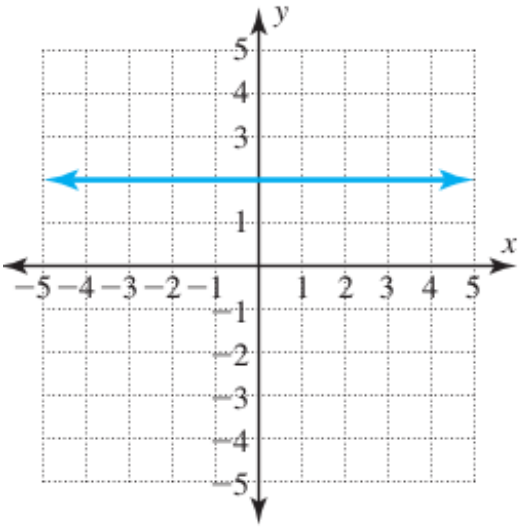
E. $f(4) = 2$.

F. $f(4) = 10$.

G. $f(4) = 6$.

H. $f(4) = 12$.

10. Use the given graph to determine the domain and range of the function.




A. The domain is $D = \mathbb{R}$ and the range is $R = \mathbb{R}$.

B. The domain is $D = \{-5, -4, -3, -2, -1, 1, 2, 3, 4, 5\}$ and the range is $R = \{-5, -4, -3, -2, -1, 1, 2, 3, 4, 5\}$.

C. The domain is $D = \{2\}$ and the range is $R = \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$.

D. The domain is $D = \mathbb{R}$ and the range is $R = \{2\}$.

E. The domain is $D = \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$ and the range is $R = \{2\}$.

F. The domain is $D = \{2\}$ and the range is $R = \mathbb{R}$.

G. The domain is $D = \{2\}$ and the range is $R = \{2\}$.

11. Use the given table of values for a linear function to determine the equation of this line in slope-intercept form

| $x$ | $y$ |
|---|---|
| 3 | $-13.5$ |
| 6 | $-24$ |
| 9 | $-34.5$ |
| 12 | $-45$ |

A. The equation of the line is $f(x) = -\frac{5}{2}x + 5$.

B. The equation of the line is $f(x) = \frac{3}{2}x + 4$.

C. The equation of the line is $f(x) = -\frac{7}{2}x - 3$.

D. The equation of the line is $f(x) = -\frac{13}{2}x + 2$.

E. The equation of the line is $f(x) = -\frac{3}{2}x - 5$.

F. The equation of the line is $f(x) = -\frac{17}{2}x - 2$.

G. The equation of the line is $f(x) = -\frac{1}{2}x + 3$.

H. The equation of the line is $f(x) = -\frac{9}{2}x - 1$.

12. Write the equation of a line having slope $-\frac{1}{2}$ and $y$-intercept $(0,-\frac{7}{4})$.

A. The equation of a line having slope $-\frac{1}{2}$ and $y$-intercept $(0,-\frac{7}{4})$ is $f(x) = -\frac{1}{2}x - \frac{7}{4}$.

B. The equation of a line having slope $-\frac{1}{2}$ and $y$-intercept $(0,-\frac{7}{4})$ is $f(x) = -2x - \frac{7}{4}$.

C. The equation of a line having slope $-\frac{1}{2}$ and $y$-intercept $(0,-\frac{7}{4})$ is $f(x) = -2x - \frac{4}{7}$.

D. The equation of a line having slope $-\frac{1}{2}$ and $y$-intercept $(0,-\frac{7}{4})$ is $f(x) = -\frac{1}{2}x - \frac{4}{7}$.

13. Find the domain and range of the of the absolute value function $f(x) = |x + 1| - 4$..

A. The domain is $D = \mathbb{R}$ and the range is $R = (-\infty, -4]$.

B. The domain is $D = [-1, \infty)$ and the range is $R = \mathbb{R}$.

C. The domain is $D = \mathbb{R}$ and the range is $R = (-\infty, -1]$.

D. The domain is $D = (-\infty, -4]$ and the range is $R = \mathbb{R}$.

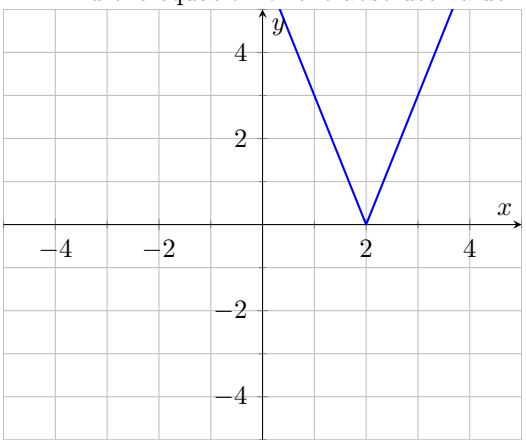
E. The domain is $D = \mathbb{R}$ and the range is $R = [-4, \infty)$.

F. The domain is $D = [-4, \infty)$ and the range is $R = \mathbb{R}$.

G. The domain is $D = (-\infty, -1]$ and the range is $R = \mathbb{R}$.

H. The domain is $D = \mathbb{R}$ and the range is $R = [-1, \infty)$.

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




A. $f(x) = 0.5|x - 1|$

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

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

D. $f(x) = -0.5|x + 1|$

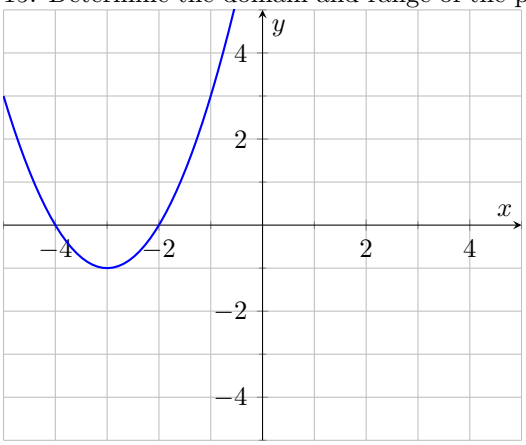
E. $f(x) = 2|x - 2| + 3$

F. $f(x) = |x + 2| - 2$

G. $f(x) = -|x - 2| - 4$

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

15. Determine the domain and range of the parabola. Also, say if the parabola opens upward or downward.




A. The domain is $D = \mathbb{R}$ and the range is $R = (-\infty, -1]$. The parabola opens upward.

B. The domain is $D = [-1, \infty)$ and the range is $R = \mathbb{R}$. The parabola opens upward.

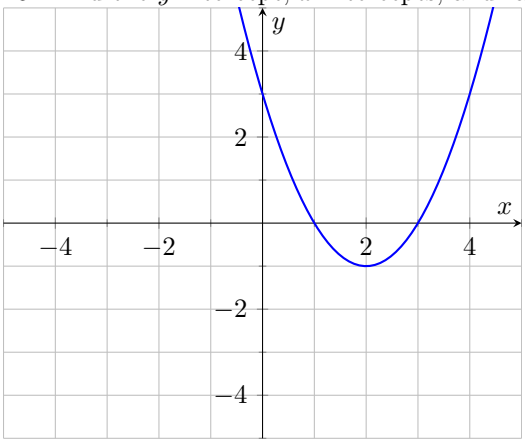
C. The domain is $D = \mathbb{R}$ and the range is $R = [-1, \infty)$. The parabola opens upward.

D. The domain is $D = \mathbb{R}$ and the range is $R = [-1, \infty)$. The parabola opens downward.

E. The domain is $D = (-\infty, -1]$ and the range is $R = \mathbb{R}$. The parabola opens upward.

F. The domain is $D = [-1, \infty)$ and the range is $R = \mathbb{R}$. The parabola opens downward.

16. Find the $y$-intercept, $x$-intercepts, and range of the parabola graphed below.




A. The $y$-intercept is $(0, 3)$. The $x$-intercepts are $(3, 0)$ and $(-2, 0)$. The range is $R = [-4, \infty)$.

B. The $y$-intercept is $(0, 3)$. The $x$-intercepts are $(1, 0)$ and $(3, 0)$. The range is $R = [-1, \infty)$.

C. The $y$-intercept is $(0, 0)$. The $x$-intercepts are $(0, 0)$ and $(-2, 0)$. The range is $R = (-\infty, -1]$.

D. The $y$-intercept is $(0, 0)$. The $x$-intercepts are $(3, 0)$ and $(-2, 0)$. The range is $R = (-\infty, -1]$.

E. The $y$-intercept is $(0, 3)$. The $x$-intercepts are $(0, 0)$ and $(1, 0)$. The range is $R = (-\infty, -1]$.

F. The $y$-intercept is $(0, 0)$. The $x$-intercepts are $(3, 0)$ and $(1, 0)$. The range is $R = (-\infty, -4]$.

G. The $y$-intercept is $(0, 3)$. The $x$-intercepts are $(0, 0)$ and $(-2, 0)$. The range is $R = [-4, \infty)$.

H. The $y$-intercept is $(0, 0)$. The $x$-intercepts are $(0, 0)$ and $(1, 0)$. The range is $R = [-4, \infty)$.

17. The $x$-intercepts of a parabola are $(-4, 0)$ and $(0, 0)$. Determine the $x$-coordinate of the vertex.

A. The $x$-coordinate of the vertex is $-1$.

B. The $x$-coordinate of the vertex is $-2$.

C. The $x$-coordinate of the vertex is $-4$.

D. The $x$-coordinate of the vertex is 0.

E. The $x$-coordinate of the vertex is $-2.5$.

F. The $x$-coordinate of the vertex is $-1.5$.

18. Use the graph of the linear function to find interval(s) where the function $f(x) = -0.5x - 2$ is negative.

A. The function $f(x)$ is negative on $(-\infty, -4)$

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

C. The function $f(x)$ is negative on $(-2, \infty)$

D. The function $f(x)$ is negative on $(-4, \infty)$

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

F. The function $f(x)$ is negative on $\emptyset$

G. The function $f(x)$ is negative on $(-\infty, -2) \cup (-4, \infty)$

H. The function $f(x)$ is negative on $(-\infty, -4) \cup (-2, \infty)$

19. Find interval(s) on which the function $f(x) = -0.5x^2 + 3x - 1$ is decreasing.

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

B. The function $f(x)$ is decreasing on $(-5, -1)$.

C. The function $f(x)$ is decreasing on $(3, \infty)$.

D. The function $f(x)$ is decreasing on $(-\infty, -5) \cup (-1, \infty)$.

E. The function $f(x)$ is decreasing on $(-1, -5)$.

F. The function $f(x)$ is decreasing on $(-\infty, -1) \cup (-5, \infty)$.

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

H. The function $f(x)$ is decreasing on $(-3, \infty)$.

20. Find interval(s) where the function $f(x) = -2x - 3$ is positive.

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

B. The function $f(x)$ is positive on $(-3, \infty)$

C. The function $f(x)$ is positive on $(-\infty, -1.5) \cup (-3, \infty)$

D. The function $f(x)$ is positive on $(-\infty, -3) \cup (-1.5, \infty)$

E. The function $f(x)$ is positive on $(-\infty, -3)$

F. The function $f(x)$ is positive on $(-\infty, -1.5)$

G. The function $f(x)$ is positive on $\emptyset$

H. The function $f(x)$ is positive on $(-1.5, \infty)$

**Answers**

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