Basic Algebra 2 Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS.

$$3x(x+6)+4(2-2x)=ax^2+bx+c$$

1. FREE RESPONSE: In the equation above, a, b, and c are constants. If the equation is true for all values of x, what is the value of b?

$$2x^2-8x-42=0$$

3. FREE RESPONSE: If n is a solution to the equation above and $n>0$, what is the value of n?

$$(nx+f)(nx-f)=25x^2-81$$

2. In the equation above, n and f are constants. Which of the following could be the value of n?

(A) -9

(B) 3

(C) 5

(D) 9

$$\frac{x^2+4}{x-1}=-4$$

4. What are all values of x that satisfy the equation above?

(A) -4

(B) 0

(C) 1

(D) 0 and -4

$$\sqrt{3x} = x - 6$$

5. What is the solution set for x to the equation above?

(A) $\{3, 12\}$

(B) $\{3\}$

(C) $\{6\}$

(D) $\{12\}$

7. Which of the following is a value of x for which the expression $\dfrac{2x+4}{x^2 + 6x - 27}$ is undefined?

(A) -3

(B) -2

(C) 3

(D) 9

$$\frac{1+x}{x} = -\frac{x}{4}$$

6. Which of the following represents all the possible values of x that satisfy the equation above?

(A) -2

(B) 0 and -2

(C) 0 and 2

(D) 2

8. What is the sum of the solutions to $(x - 4.4)(x + 7.3) = 0$?

(A) -11.7

(B) -2.9

(C) 2.9

(D) 11.7

9. FREE RESPONSE: If $x + y = 6$ and $x - y = 3$, what is the value of $(x - y)(x^2 - y^2)$?

11. The expression $\dfrac{1}{5}x^2 - 10$ can be rewritten as

$\dfrac{1}{5}(x - n)(x + n)$, where n is a positive constant. What is the value of n?

(A) $\sqrt{5}$

(B) $5\sqrt{2}$

(C) 10

(D) 50

$$bx^3 + dx^2 + gx + m = 0$$

10. In the equation above, b, d, g, and m are constants. If the equation has roots -6, 3, and 7, which of the following is a factor of $bx^3 + dx^2 + gx + m$?

(A) $x + 6$

(B) $x + 3$

(C) $x - 6$

(D) $x + 7$

$$y = 4x^2 - b$$

12. In the equation above, b is a positive constant and the graph of the equation in the xy-plane is a parabola. Which of the following is an equivalent form of the equation?

(A) $y = 4(x + b)(x - b)$

(B) $y = (x + \dfrac{b}{2})(x - \dfrac{b}{2})$

(C) $y = (2x + b)(2x - b)$

(D) $y = 4(x + \dfrac{\sqrt{b}}{2})(x - \dfrac{\sqrt{b}}{2})$

Quadratic Formula Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS UNLESS INDICATED.

1. Which of the following is a solution to the equation $8x = x^2 + 9$?

   (A) $4 - \sqrt{7}$

   (B) $4 + 2\sqrt{7}$

   (C) $8 + \sqrt{7}$

   (D) $8 - 2\sqrt{7}$

3. What is the sum of all values of x that satisfy the equation $2x^2 - 9x + 4 = 0$?

   (A) .5

   (B) 2.25

   (C) 3.5

   (D) 4.5

2. How many real solutions exist for the equation $x^2 - 4x + 12 = 0$?

   (A) There are infinite real solutions.

   (B) There are no real solutions.

   (C) There is exactly 1 real solution.

   (D) There are exactly 2 real solutions.

4. How many real solutions exist for the equation $2x^2 - 4x + 2 = 0$?

   (A) Exactly 4 real solutions.

   (B) Exactly 2 real solutions.

   (C) Exactly 1 real solution.

   (D) There are no real solutions.

$$h = -4.9t^2 + 46t$$

5. (CALCULATOR) FREE RESPONSE: The equation above gives the approximate height h, in meters of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 46 meters per second. After approximately how many seconds will the ball hit the ground? (Round to the nearest tenth of a second).

$$y = x^2 + 6x - 11$$
$$y = 4x + 2$$

6. How many real solutions exist for the system of equations above?

   (A) There are no real solutions.

   (B) Exactly 1 real solution.

   (C) Exactly 2 real solutions.

   (D) Exactly 4 real solutions.

$$y = 2x^2 - 7x + 1$$
$$y = x - 1$$

7. FREE RESPONSE: If a and b are solutions to the system of equations above, what is the value of $a + b$?

$$x^2 - \frac{n}{4}x = 3t$$

8. (CALCULATOR) In the quadratic equation above, n and t are constants. What are the solutions for x?

   (A) $\dfrac{n}{8} \pm \dfrac{\sqrt{n^2 + 192t}}{8}$

   (B) $\dfrac{n}{4} \pm \dfrac{\sqrt{n^2 + 192t}}{8}$

   (C) $\dfrac{n}{8} \pm \dfrac{\sqrt{16n^2 + 12t}}{8}$

   (D) $\dfrac{n}{4} \pm \dfrac{\sqrt{16n^2 + 12t}}{8}$

Advanced Algebra 2 Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS.

$$x - 2 = \frac{8}{x-2}$$

1. In the equation above, which of the following is a possible value of $x-2$?

(A) $2\sqrt{2} - 2$

(B) 2

(C) $2\sqrt{2}$

(D) $2 + 2\sqrt{2}$

2. In the xy-plane, the graph of the function
$f(x) = x^2 + 2x - 35$ has two x-intercepts.
What is the distance between the x-intercepts?

(A) 2

(B) 9

(C) 12

(D) 35

3. In the xy-plane, the graph of function f has x-intercepts at -6, -2, and 2. Which of the following could define f?

(A) $f(x) = (x-6)(x-2)(x+2)$

(B) $f(x) = (x+6)(x-2)(x+2)$

(C) $f(x) = (x-2)^2(x+6)$

(D) $f(x) = (x+2)^2(x-6)$

$$(ax - 3)(6x + 3) + 9 - 2x^2$$

4. In the expression above, a is a constant. If the expression is equivalent to bx, where b is a constant, what is the value of b?

(A) -17

(B) -12

(C) -9

(D) -6

5. FREE RESPONSE: In the xy-plane, the graph of $y = 4x^2 - 17x$ intersects the graph of $y = -x$ at the points $(0,0)$ and (b,b). What is the value of b?

$$x^6 - 13x^4 = -36x^2$$

6. FREE RESPONSE: If $x > 0$, what is one possible solution to the equation above?

$$x^3 - 4x^2 - 2x + 8 = 0$$

9. FREE RESPONSE: For what integer value of x is the equation above true?

$$3x^2 - 6x = n$$

7. In the equation above, n is a constant. If the equation has no real solutions, which of the following could be the value of n?

(A) -4

(B) -3

(C) 1

(D) 3

$$(ax + 2)(6x^2 - bx + 5) = 18x^3 - 3x^2 + 5x + 10$$

10. FREE RESPONSE: The equation above is true for all x, where a and b are constants. What is the value of ab?

$$f(x) = \frac{1}{(x-3)^2 + 5(2x-4) + 6}$$

8. FREE RESPONSE: If $x > 0$ in the function f above, for what value of x is the function undefined?

Algebra 2 Parabolas Practice Questions

DO NOT USE A CALCULATOR ON ANY OF THE FOLLOWING QUESTIONS UNLESS INDICATED.

1. The equation $y = 3x^2 + 12x - 15$ is graphed in the xy-plane. If the graph crosses the y-axis at the point $(0, t)$, what is the value of t?

   (A) -15

   (B) -12

   (C) 12

   (D) 15

2. The function f is defined by $f(x) = (x + 6)(x + 2)$. The graph of f in the xy-plane is a parabola. Which of the following intervals contains the x-coordinate of the vertex of the graph of f?

   (A) $-6 < x < -4$

   (B) $-6 < x < 2$

   (C) $-4 < x < 2$

   (D) $2 < x < 6$

$$h(t) = -22t^2 + 75t + 14$$

3. The quadratic function above models the height above the ground h, in feet, of a tennis ball t seconds after it was launched vertically from an air cannon resting on an elevated platform. If $y = h(t)$ is graphed in the xy-plane, which of the following represents the real-life meaning of the positive x-intercept of the graph?

   (A) The height, in feet, of the elevated platform.

   (B) The time, in seconds, at which the tennis ball hits the ground.

   (C) The maximum height, in feet, of the tennis ball.

   (D) The total distance, in feet, that the tennis ball travels.

(−4, 7)   (−2, 7)

(−3, 5)
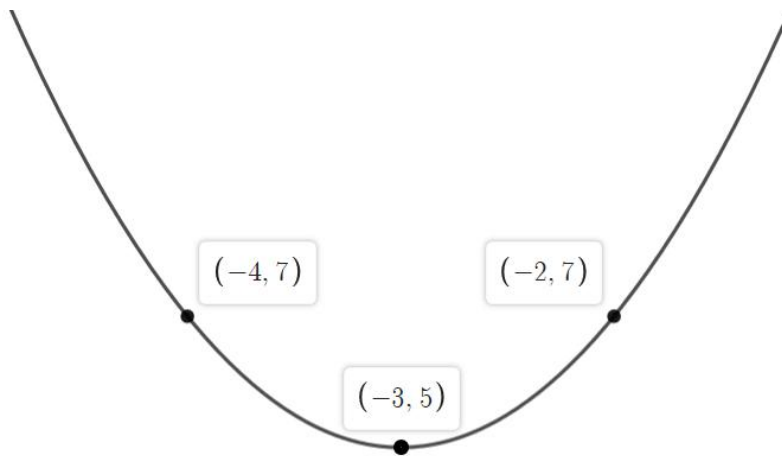
4. The graph of the function f in the xy-plane above (axes not shown) is a parabola. Which of the following defines f?

(A) $y = 2(x-3)^2 + 5$

(B) $y = 2(x+3)^2 - 5$

(C) $y = (x+3)^2 + 5$

(D) $y = 2(x+3)^2 + 5$

$$y = -(x-4)^2 - a$$

5. In the equation above, a is a constant. The graph of the equation in the xy-plane is a parabola. Which of the following is true about the parabola?

(A) Its minimum occurs at $(-4, -a)$.

(B) Its minimum occurs at $(4, a)$.

(C) Its maximum occurs at $(4, -a)$.

(D) Its maximum occurs at $(-4, a)$.

6. In the xy-plane, the parabola with equation $y = (x-7)^2$ intersects the line with equation $y = 36$ at two points, A and B. What is the length of $\overline{AB}$?

(A) 14.5

(B) 14

(C) 12

(D) 7
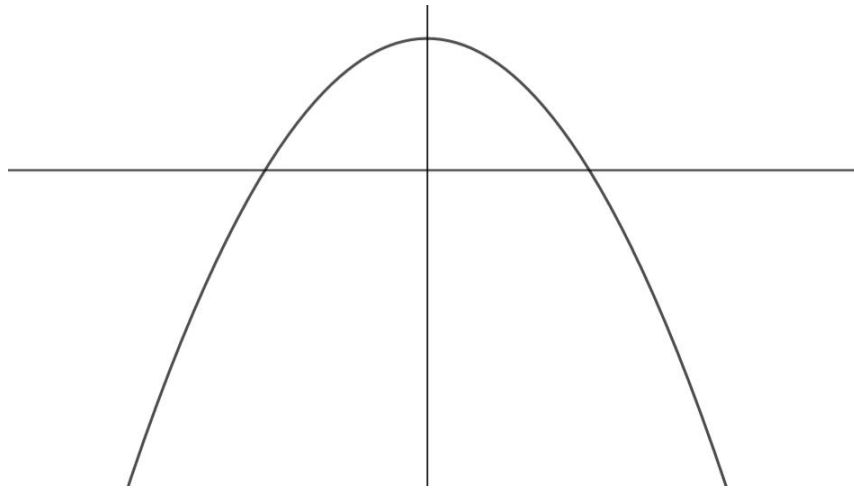
7. The equation of the parabola above is $y = ax^2 + n$ and the vertex of the parabola in the xy-plane above is $(0, n)$. Which of the following is true about the parabola with the equation $y = -a(x + m)^2 - n$?

(A) The vertex is (m, n) and the graph opens downward.

(B) The vertex is (m, n) and the graph opens upward.

(C) The vertex is $(-m, -n)$ and the graph opens downward.

(D) The vertex is $(-m, -n)$ and the graph opens upward.

$$h(t) = -38t^2 + 25t + 6$$

8. The function above models the height of a rock h, in feet, t seconds after the rock is tossed straight up into the air. What does the number 6 represent in the function?

(A) The number of seconds before the rock was tossed.

(B) The initial height in feet that the rock was tossed from.

(C) The time in seconds until the rock hits the ground.

(D) The initial speed, in feet per second, that the rock was tossed at.

9. If $y = 10x^2 - 49x + 25$ is graphed in the xy-plane, which of the following characteristics of the graph is displayed as a constant or coefficient in the equation?

(A) y-intercept

(B) x-intercept(s)

(C) y-coordinate of the vertex

(D) x-coordinate of the vertex

$$y = n(x+7)(x-3)$$

10. In the quadratic equation above, n is a nonzero constant. The graph of the equation in the xy-plane is a parabola with vertex (f, g). Which of the following is equal to g?

(A) $-25n$

(B) $-21n$

(C) $4n$

(D) $10n$

12. FREE RESPONSE: In the xy-plane, a line that has the equation $y = b$ for some constant b intersects the parabola at exactly one point. If the parabola has the equation $y = x^2 + 2x - 8$, what is the value of $-b$?

$$y = 2x^2 - 10x - 12$$

11. The equation above represents a parabola in the xy-plane. Which of the following equivalent forms of the equation displays the x-intercepts of the parabola as constants or coefficients?

(A) $y + 12 = 2x^2 - 10x$

(B) $y = 2(x^2 - 5x) - 12$

(C) $y = 2(x-3)^2 + 2x - 30$

(D) $y = 2(x+1)(x-6)$

$$f(x) = (x+2)(x-5)$$

13. (CALCULATOR) Which of the following is an equivalent form of the function f above in which the minimum value of f appears as a constant or coefficient?

(A) $f(x) = x^2 - 10$

(B) $f(x) = x^2 - 3x - 10$

(C) $f(x) = (x-1.5)^2 - 12.25$

(D) $f(x) = (x+1.5)^2 - 12.25$

14. The scatterplot below shows the number of motorcycles on the road, in thousands, over a 10-year period.

Motorcycles on the road (thousands)
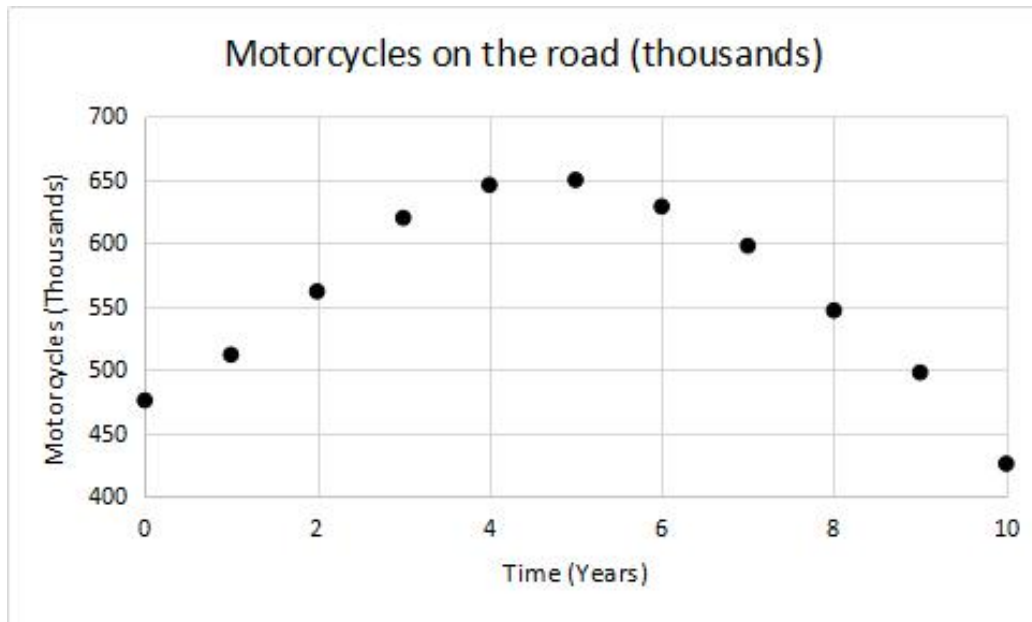
Of the following equations, which best models the data in the scatterplot?

(A) $y = -7.927x^2 + 75.53x + 460.17$

(B) $y = 7.927x^2 + 75.53x + 460.17$

(C) $y = -7.927x^2 + 75.53x - 460.17$

(D) $y = 7.927x^2 + 75.53x - 460.17$