Quadratics

1

Which expression is equivalent to $(2x^2 - 4) - (-3x^2 + 2x - 7)$?

A) $5x^2 - 2x + 3$

B) $5x^2 + 2x - 3$

C) $-x^2 - 2x - 11$

D) $-x^2 + 2x - 11$

3

What are the solutions of the quadratic equation $4x^2 - 8x - 12 = 0$?

A) $x = -1$ and $x = -3$

B) $x = -1$ and $x = 3$

C) $x = 1$ and $x = -3$

D) $x = 1$ and $x = 3$

4

$$9a^4 + 12a^2b^2 + 4b^4$$

Which of the following is equivalent to the expression shown above?

A) $(3a^2 + 2b^2)^2$

B) $(3a + 2b)^4$

C) $(9a^2 + 4b^2)^2$

D) $(9a + 4b)^4$

4

Which of the following is an example of a function whose graph in the xy-plane has no x-intercepts?

A) A linear function whose rate of change is not zero

B) A quadratic function with real zeros

C) A quadratic function with no real zeros

D) A cubic polynomial with at least one real zero

5

$$\sqrt{k+2} - 9 = 0$$

In the equation above, k is a constant. If $x = 9$, what is the value of k ?

A) 1

B) 7

C) 16

D) 79

6

Which of the following is equivalent to the sum of the expressions $a^2 - 1$ and $a + 1$?

A) $a^2 + a$

B) $a^3 - 1$

C) $2a^2$

D) a^3

9

$$\sqrt{x - a} = x - 4$$

If $a = 2$, what is the solution set of the equation above?

A) {3, 6}

B) {2}

C) {3}

D) {6}

8

Which of the following is an equivalent form of $(1.5x - 2.4)^2 - (5.2x^2 - 6.4)$?

A) $-2.2x^2 + 1.6$

B) $-2.2x^2 + 11.2$

C) $-2.95x^2 - 7.2x + 12.16$

D) $-2.95x^2 - 7.2x + 0.64$

10

If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $4z + 8y$?

A) $(a + 2b)^2$

B) $(2a + 2b)^2$

C) $(4a + 4b)^2$

D) $(4a + 8b)^2$

12

In the xy-plane, the graph of function f has x-intercepts at -3, -1, and 1. Which of the following could define f ?

A) $f(x) = (x - 3)(x - 1)(x + 1)$

B) $f(x) = (x - 3)(x - 1)^2$

C) $f(x) = (x - 1)(x + 1)(x + 3)$

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

12

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

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

A) $-9a$

B) $-8a$

C) $-5a$

D) $-2a$

14

What are the solutions to $3x^2 + 12x + 6 = 0$?

A) $x = -2 \pm \sqrt{2}$

B) $x = -2 \pm \frac{\sqrt{3}}{3}$

C) $x = -6 \pm \sqrt{2}$

D) $x = -6 \pm 6\sqrt{2}$

16

$$x^3(x^2 - 5) = -4x$$

If $x > 0$, what is one possible solution to the equation above?

19

$$\frac{2x + 6}{(x + 2)^2} - \frac{2}{x + 2}$$

The expression above is equivalent to $\frac{a}{(x + 2)^2}$, where a is a positive constant and $x \neq -2$.

What is the value of a ?

18

$$x^3 - 5x^2 + 2x - 10 = 0$$

For what real value of x is the equation above true?

20

What is the sum of the solutions to $(x - 6)(x + 0.7) = 0$?

A) -6.7

B) -5.3

C) 5.3

D) 6.7

25

$$h = -4.9t^2 + 25t$$

The equation above expresses 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 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5

B) 4.0

C) 4.5

D) 5.0

28

$$f(x) = (x + 6)(x - 4)$$

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) $f(x) = x^2 - 24$

B) $f(x) = x^2 + 2x - 24$

C) $f(x) = (x - 1)^2 - 21$

D) $f(x) = (x + 1)^2 - 25$

33

In the xy-plane, the point $(3, 6)$ lies on the graph of the function $f(x) = 3x^2 - bx + 12$. What is the value of b ?

33

$$(-3x^2 + 5x - 2) - 2(x^2 - 2x - 1)$$

If the expression above is rewritten in the form $ax^2 + bx + c$, where a, b, and c are constants, what is the value of b ?

30

$$y = x^2 - a$$

In the equation above, a 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) $y = (x + a)(x - a)$

B) $y = (x + \sqrt{a})(x - \sqrt{a})$

C) $y = \left(x + \frac{a}{2}\right)\left(x - \frac{a}{2}\right)$

D) $y = (x + a)^2$