

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

Without solving, determine the number of real solutions for each quadratic equation.

1. $b^2 - 4b + 3 = 0$

$a=1 \quad b=-4 \quad c=3$

$b^2 - 4ac$

$(-4)^2 - 4(1)(3)$

$16 - 12$

4

$D > 0$

2 Real Solutions

2. $2n^2 + 7 = -4n + 5$

$2n^2 + 4n + 2 = 0$

$a=2 \quad b=4 \quad c=2$

$b^2 - 4ac$

$4^2 - 4(2)(2)$

$16 - 16$

0

$D = 0$

1 real solution

3. $x - 3x^2 = 5 + 2x - x^2$

$2x^2 + x + 5 = 0$

$a=2 \quad b=1 \quad c=5$

$b^2 - 4ac$

$1^2 - 4(2)(5)$

$1 - 40$

-39

$D < 0$

No Real Solutions

4. $4q + 7 = q^2 - 5q + 1$

$q^2 - 9q - 6 = 0$

$a=1 \quad b=-9 \quad c=-6$

$b^2 - 4ac$

$(-9)^2 - 4(1)(-6)$

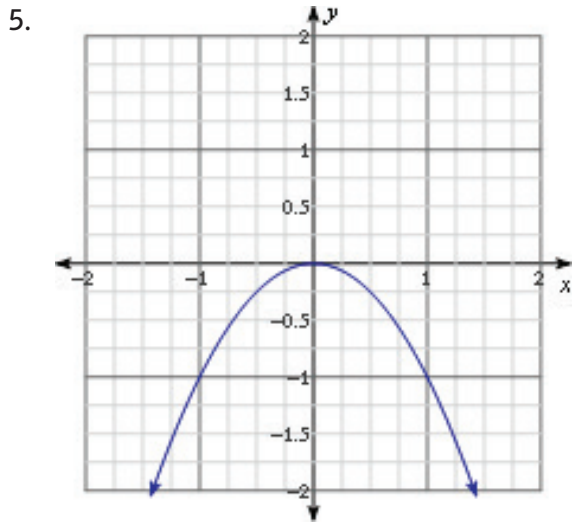
$81 + 24$

105

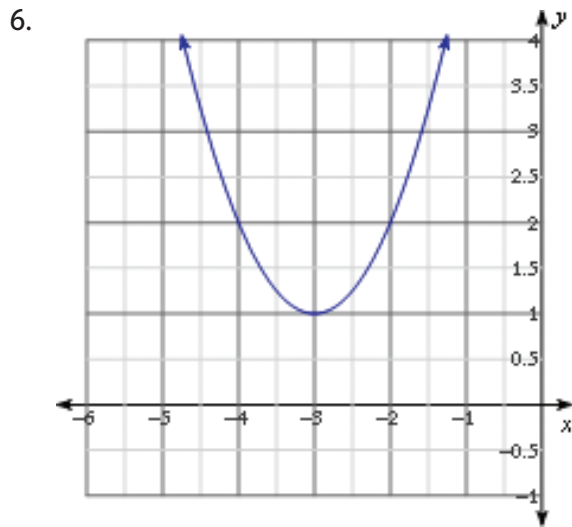
$D > 0$

2 Real Solutions

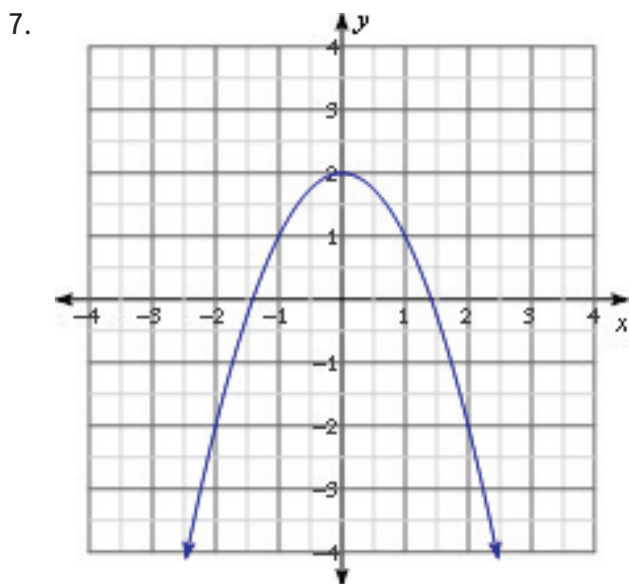
Based on the graph of each quadratic function, $y = f(x)$, determine the number of real solutions for each corresponding quadratic equation, $f(x) = 0$.



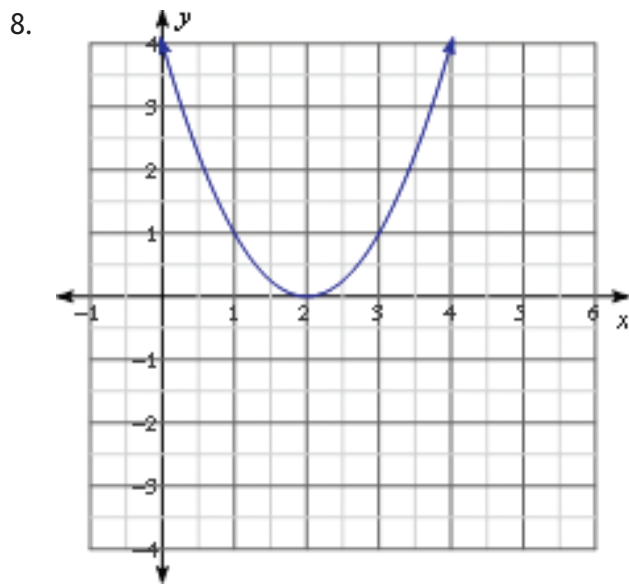
ONE REAL SOLUTION



NO REAL SOLUTIONS



TWO REAL SOLUTIONS



ONE REAL SOLUTION

9. Consider the quadratic function $f(x) = x^2 - 7$.

A. Find the x-intercepts of the graph of the function.

$$\begin{aligned} f(x) &= x^2 - 7 \\ 0 &= x^2 - 7 \\ \sqrt{7} &= \sqrt{x^2} \\ \pm\sqrt{7} &= x \end{aligned}$$

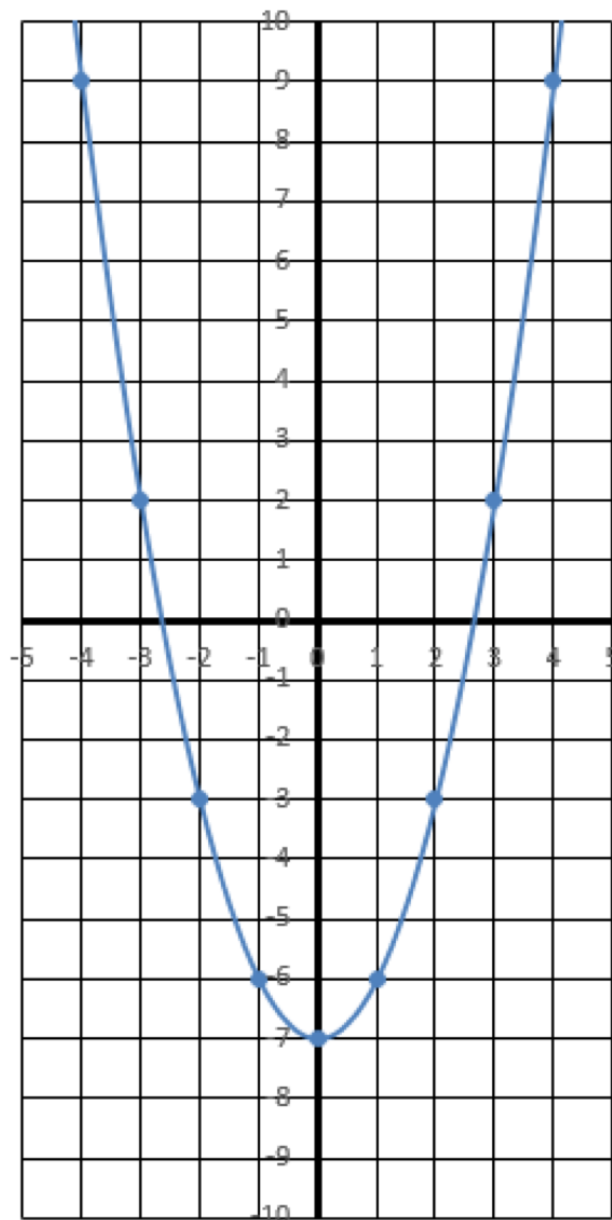
B. Use the x-intercepts to write the quadratic function in factored form.

$$f(x) = (x + \sqrt{7})(x - \sqrt{7})$$

C. Show that the function from Part B written in factored form is equivalent to the original function.

$$\begin{aligned} f(x) &= (x + \sqrt{7})(x - \sqrt{7}) \\ &= x^2 - \cancel{x\sqrt{7}} + \cancel{x\sqrt{7}} - 7 \\ &= x^2 - 7 \end{aligned}$$

D. Graph the equation.



10. **Challenge** Consider the quadratic function $f(x) = -2x^2 + x + 5$.

cannot be factored
use quad. form.

A. Find the x-intercepts of the graph of the function.

$$a = -2 \quad b = 1 \quad c = 5$$

$$\begin{array}{r} -10 \\ \times \\ 1 \end{array}$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(-2)(5)}}{2(-2)} = \frac{-1 \pm \sqrt{1 + 40}}{-4} = \frac{-1 \pm \sqrt{41}}{-4}$$

B. Use the x-intercepts to write the quadratic function in factored form.

$$f(x) = -2 \left(x - \frac{1 + \sqrt{41}}{4} \right) \left(x - \frac{1 - \sqrt{41}}{4} \right)$$

C. Graph the equation.

