

Name:

KEY

Date:

Hour:

## Algebra 1

## Solve by Factoring Quadratics Practice WS

Solve each by factoring.

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

$$\begin{array}{c}
 a \quad b \quad c \\
 a \cdot c = -12 \\
 \begin{array}{c|c}
 1 & 12 \\
 2 & 6 \\
 \hline
 -3 & 4
 \end{array}
 \end{array}$$

$$\begin{aligned}
 (3x^2 - 3x) + (4x - 4) &= 0 \\
 3x(x-1) + 4(x-1) &= 0 \\
 (3x+4)(x-1) &= 0 \\
 \boxed{x = -\frac{4}{3} \text{ and } x = 1}
 \end{aligned}$$

2.  $-2x^2 = -48$

$$\frac{-2x^2}{-2} = \frac{-48}{-2}$$

$$\sqrt{x^2} = \sqrt{24}$$

$$\boxed{x = \pm 2\sqrt{6}}$$

3.  $1 - 6x = -9x^2$

$$\begin{array}{c}
 a \quad b \quad c \\
 9x^2 - 6x + 1 = 0
 \end{array}$$

$$\begin{array}{c|c}
 9 & 1 \\
 7 & 9 \\
 \hline
 -3 & -3
 \end{array}$$

$$\begin{aligned}
 (9x^2 - 3x)(3x + 1) &= 0 \\
 3x(3x-1) - 1(3x-1) &= 0 \\
 (3x-1)(3x-1) &= 0
 \end{aligned}$$

$$\boxed{x = \frac{1}{3}}$$

4. Robert threw a rock off a bridge into the river. The distance from the rock to the river is modeled by the equation  $h = -16t^2 - 16t + 60$ , where  $h$  is the height in feet and  $t$  is the time in seconds. How long will it take the rock to hit the water?

$$-16t^2 - 16t + 60 = 0$$

$$\begin{array}{c|c}
 -60 & \\
 1 & 60 \\
 2 & 30 \\
 3 & 20 \\
 4 & 15 \\
 5 & 12 \\
 \hline
 -6 & 10
 \end{array}$$

$$(4t^2 - 6t) + (10t - 15) = 0$$

$$2t(2t-3) + 5(2t-3) = 0$$

$$(2t+5)(2t-3) = 0$$

$$\boxed{t = -\frac{5}{2} \text{ and } t = \frac{3}{2}}$$

5. During a game of golf, Kayley hits her ball out of a sand trap. The height of the golf ball is modeled by the equation  $h = -16t^2 + 20t - 4$ , where  $h$  is the height in feet and  $t$  is the time in seconds since the ball was hit.

- a. How long does it take for the golf ball to hit the ground?

$$-16t^2 + 20t - 4 = 0$$

$$\begin{array}{c|c}
 4 & \\
 -1 & 4 \\
 \hline
 2 & 2
 \end{array}$$

$$(4t^2 - t)(4t + 1) = 0 \quad t = 1 \text{ or } t = \frac{1}{4}$$

$$t(4t-1) - 1(4t-1) = 0$$

$$(t-1)(4t-1) = 0$$

1 second to hit the ground

- b. How high is the golf ball after 1.5 seconds?

$$h = -16(1.5)^2 + 20(1.5) - 4$$

6. An explosion causes debris to rise vertically with an initial speed of 72 feet per second. The equation  $h = -16t^2 + 72t$  describes the height of the debris above the ground,  $h$ , in feet,  $t$  seconds after the explosion. How long is the debris in the air?

$$-16t^2 + 72t = 0$$

$$-8t(2t-9) = 0$$

$$t = 0 \text{ or } t = \frac{9}{2}$$

The debris is in the air for 4.5 seconds.

**EXTRA PRACTICE:**

Solve each equation by factoring. Find the roots. Find the zeros. Find the x-intercepts. (All of these directions mean the exact same thing.)

7)  $9k^2 + 7 = 583$

$\{8, -8\}$

8)  $4r^2 + 6 = 42$

$\{3, -3\}$

9)  $10x^2 + 1 = 1001$

$\{10, -10\}$

10)  $9b^2 + 10 = 19$

$\{1, -1\}$

11)  $x^2 - 12x = -35$

$\{7, 5\}$

12)  $n^2 + 8n = -15$

$\{-5, -3\}$

13)  $p^2 = 10p - 21$

$\{3, 7\}$

14)  $n^2 - 14 = -5n$

$\{2, -7\}$

15)  $5r^2 + 6 = 17r$

$\left\{\frac{2}{5}, 3\right\}$

16)  $5x^2 = -2 + 7x$

$\left\{\frac{2}{5}, 1\right\}$