Bell Work

Solve each quadratic equation. Show all work.

1. $x^2 - 7x - 60 = 0$

2. $3x^2 + 13x - 10 = 0$

3. $x^2 + 6x - 20 = 0$

4. What is the quadratic formula?

1. A ball is thrown up at a velocity of 37 feet per second at a height of 6 ft. When will it reach a height of 20 feet?

$$20 = -\frac{1}{2}(32)t^2 + 37t + 6$$

$$g = \frac{32\ \text{ft}}{\text{sec}^2}$$

$$h(t) = -\frac{1}{2}gt^2 + v_i t + h_i$$

$$20 = -16t^2 + 37t + 6$$

$$0 = -16t^2 + 37t - 14$$

$$x = \frac{-37 \pm \sqrt{(37)^2 - (4)(-16)(-14)}}{-32}$$

$$\approx \frac{-37 \pm 21.75}{-32}$$

The ball will reach 20 feet at 0.48 seconds going up and 1.84 seconds coming down.

$$= \frac{-37 - 21.75}{-32} \approx 1.84 \qquad = \frac{-37 + 21.75}{-32} \approx 0.48$$

2. A ball is thrown up into the air at 21.6 meters per second at an initial height of 2.5 m. When will it reach a height of 18 m?

$$18 = -\frac{1}{2}(9.8)t^2 + 21.6t + 2.5$$

$$g = \frac{9.8\,m}{\sec^2}$$

$$h(t) = -\frac{1}{2}gt^2 + v_i t + h_i$$

$$18 = -4.9t^2 + 21.6t + 2.5$$

$$0 = -4.9t^2 + 21.6t - 15.5$$

$$x = \frac{-21.6 \pm \sqrt{21.6^2 - (4)(-4.9)(-15.5)}}{-9.8}$$

$$\approx \frac{-21.6 \pm 12.76}{-9.8}$$

$$= \frac{-21.6 - 12.76}{-9.8} \approx 3.51 \quad = \frac{-21.6 + 12.76}{-9.8} \approx 0.90$$

The ball will reach a height of 18 meters in 0.9 seconds going up and 3.51 seconds coming down.

3. A ball is thrown up at a velocity of 46 feet per second at a height of 5 ft. When will it reach a height of 35 feet?

$$35 = -\frac{1}{2}(32)t^2 + 46t + 5$$

$$g = \frac{32\ \text{ft}}{\text{sec}^2}$$

$$h(t) = -\frac{1}{2}gt^2 + v_i t + h_i$$

$$35 = -16t^2 + 46t + 5$$

$$0 = -16t^2 + 46t - 30$$

$$x = \frac{-46 \pm \sqrt{46^2 - (4)(-16)(-30)}}{-32} = \frac{-46 \pm 14}{-32}$$

$$= \frac{-46 - 14}{-32} \approx 1.88$$

$$= \frac{-46 + 14}{-32} \approx 1$$

The ball will reach 35 feet at 1 second going up and 1.88 seconds coming down.

Assignment:

Solving Quadratic Equation Word Problems B Worksheet