

Name: Guide Date: _____**Quadratic Applications**

1. You drop a ball off a cliff at 320 ft. How long does it take the ball to hit the ground? $0 = -16t^2 + 320$

$$16t^2 = 320$$

$$t^2 = \frac{320}{16}$$

$$t = \sqrt{\frac{320}{16}} \approx \boxed{4.47 \text{ sec}}$$

2. You launched a model rocket with an initial speed of 64 feet per second and a start height of 512. After how many seconds will the rocket hit the ground?

$$0 = -16t^2 + 64t + 512$$

A ball is thrown into the air from a height of 256 feet at time $t = 0$. The function that models this situation is $h(t) = -16t^2 + 96t + 256$, where t is measured in seconds and h is the height in feet.

3. What is the height of the ball at 2 seconds? $h(2) = -16(2)^2 + 96(2) + 256 = \boxed{384 \text{ ft}}$

4. When will the ball reach a height of 144 feet? $144 = -16t^2 + 96t + 256$

5. When will the ball hit the ground? $0 = -16t^2 + 96t + 256$

$$0 = 16t^2 - 96t - 256$$

$$t = 8, \cancel{t}$$

$$0 = t^2 - 6t - 16$$

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

$$\boxed{t = 8 \text{ sec}}$$

Solve each quadratic equation using the best method.

6. $2x^2 - 100 = 0$

$$2x^2 = 100$$

$$x^2 = 50$$

$$x = \pm \sqrt{50}$$

$$x = \pm 5\sqrt{2}$$

7. $(x+2)^2 + 16 = 0$

8. $6x^2 + 25x + 11 = 0$

$$(3x + 11)(2x + 1) = 0$$

$$3x + 11 = 0 \quad ; \quad 2x + 1 = 0$$

$$3x = -11 \quad ; \quad 2x = -1$$

$$x = -\frac{11}{3} \quad x = -\frac{1}{2}$$

9. $9x^2 - 36x = 0$

10. $4x^2 + 9x + 1 = 0$

$$a = 4 \quad x = \frac{-(9) \pm \sqrt{(9)^2 - 4(4)(1)}}{2(4)}$$

$$b = 9 \quad x = \frac{-9 \pm \sqrt{65}}{8}$$

$$c = 1 \quad x = \frac{-9 \pm \sqrt{65}}{8}$$

11. $2x^2 + x - 14 = 0$