

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? $0 = -16t^2 + 320$

$$-320 = -16t^2$$

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

$$t = 4.47 \text{ seconds}$$

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? $h(2) = -16(2)^2 + 96(2) + 256 = 384 \text{ ft}$

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

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

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

$$0 = -16(t - 8)(t + 2)$$

$$-16 = 0 \quad t - 8 = 0 \quad t + 2 = 0$$

$$\text{Nope! } \boxed{t = 8} \quad t = -2$$

Solve each quadratic equation using the best method.

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

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

$$(x+2)^2 = -16$$

No real

answer

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

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

$$9x(x-4) = 0$$

$$9x = 0 \quad ; \quad x - 4 = 0$$

$$\boxed{x = 0, x = 4}$$

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

11. $2x^2 - 5x - 12 = 0$

$$(2x+3)(x-4) = 0$$

$$2x+3=0 \quad ; \quad x-4=0$$

$$2x = -3$$

$$\boxed{x = -\frac{3}{2} \quad ; \quad x = 4}$$