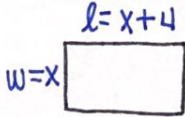


Name: _____ Date: _____

Quadratic Applications

1. The length of a rectangle is 4 cm more than the width. The area is 96cm. Find the dimensions of the rectangle.



$$x(x+4)=96$$

$$x^2+4x=96$$

$$x^2+4x+4=96+4$$

$$\sqrt{(x+2)^2}=\sqrt{100}$$

$$x+2=\pm 10$$

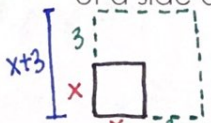
$$\begin{array}{r} x+2=10 \\ -2 \quad -2 \\ \hline x=8 \end{array}$$

$$\begin{array}{r} x+2=-10 \\ -2 \quad -2 \\ \hline x=-12 \end{array}$$

**W=8m
L=12m**

length can't be negative

2. If the sides of a square are increased by 3 m, the area becomes 64 m. Find the length of a side of the original square.



$$(x+3)(x+3)=64$$

$$\sqrt{(x+3)^2}=\sqrt{64}$$

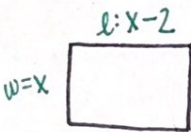
$$x+3=\pm 8$$

$$\begin{array}{r} x+3=8 \\ -3 \quad -3 \\ \hline x=5 \end{array}$$

$$\begin{array}{r} x+3=-8 \\ -3 \quad -3 \\ \hline x=-11 \end{array}$$

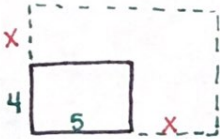
5 meters

3. The width of a rectangle is 2 m less than the length. The area is 48 m. Find the dimensions.



**W=6m
L=8m**

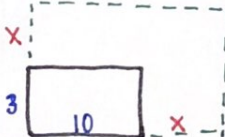
4. The dimensions of a rectangular garden were 4 m by 5 m. Each dimension was increased by the same amount. The garden then had an area of 56 m. Find the dimensions of the new garden. (Hint: Let x be the amount of increase.)



x=3

7m by 8m

5. The dimensions of a rectangular garden were 3 m by 10 m. When both dimensions were increased by equal amounts, the area of the garden doubled. Find the dimensions of the new garden.



$$(x+3)(x+10)=60$$

$$x^2+13x+30=60$$

$$x^2+13x-30=0$$

$$(x+15)(x-2)=0$$

$$\begin{array}{r} x+15=0 \\ -15 \quad -15 \\ \hline x=-15 \end{array}$$

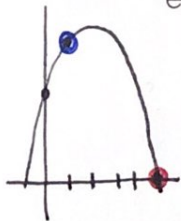
$$\begin{array}{r} x-2=0 \\ +2 \quad +2 \\ \hline x=2 \end{array}$$

**3+2=5
10+2=12**

x=2

5x12

6. A football is punted into the air. Its height h , in meters, after t seconds is given by the equation $h = -4.9t^2 + 24.5t + 1$



a. How high is the ball after 1 second? $h(1) = -4.9(1)^2 + 24.5(1) + 1$
 $= 20.6m$

b. When does the ball hit the ground?
 $-4.9t^2 + 24.5t + 1 = 0$ → the height of the ground

$$\frac{-24.5 \pm \sqrt{(24.5)^2 - 4(-4.9)(1)}}{2(-4.9)} = \frac{-24.5 \pm 24.8}{-9.8} = 5 \text{ seconds}$$

7. You drop a water balloon off a cliff at 800 ft. How long does it take the ball to hit the ground? $0 = -16t^2 + 800$

≈ 7.07 seconds

Name: _____ 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? $0 = -16t^2 + 320$

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

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

~~$$t = -4$$~~

$$t = 8 \text{ seconds}$$

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? $h(2) = -16(2)^2 + 96(2) + 256$

$$h(2) = 384 \text{ ft}$$

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

~~$$t = -1$$~~

$$t = 7 \text{ seconds}$$

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

$$t = -2$$

$$t = 8 \text{ seconds}$$

Solve each quadratic equation using the best method.

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

SQ

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

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

SQ

$$\text{No real solutions}$$

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

F

$$x = -1/2$$

$$x = -11/3$$

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

F

$$x = 0$$

$$x = 4$$

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

QF

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

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

QF

$$x = \frac{-1 \pm \sqrt{113}}{4}$$