

A. Solving Quadratic Equations by Graphing

REMEMBER

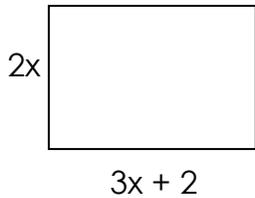
- **Root** – another word for solution of an equation.
- **Zero** – A zero of a function is an x – intercept.
- **Solutions** (roots) of equations occur at the x – intercepts (zeros) of the function.

1. What are the zeros of $x^2 + 6x - 10 = 0$ to the nearest 100th? _____
2. What are the solutions of $x^2 + 4x = -3$ to the nearest 100th? _____
3. What are the roots of $-7 + 11x = x^2$ to the nearest 100th? _____
4. What are the solutions of $-8 = x^2 + 2x$ to the nearest 100th? _____

B. Quadratic Word Problems

1. A football is kicked up from ground level at an initial upward velocity of 20 feet per second. The function $h(t) = -4t^2 + 20t$ gives the height of the football after t seconds.
 - a. Graph the function $h(t)$.
 - b. What is the height of the football after 2 seconds? _____
 - c. When is the ball 16 feet high? _____
 - d. What are the zeros (x-intercepts) of the function and what do they represent?
 - e. What is the maximum height of the football and when is it reached?
 - f. How long was the football in the air? _____
2. The function $h(t) = -16t^2 + 80t + 5$ models the height (in feet) of a baseball which has been hit by a bat. The time (t) since the bat hit the ball is measured in seconds. (Round to the 100th)
 - a. How high above the ground will the ball rise? _____
 - b. How long will it take for the ball to reach that height? _____
 - c. How high above the ground will the ball be after
 - i. 1 sec? _____ 2 sec? _____ 3 sec? _____ 4 sec? _____
 - d. After the ball was hit, how long was the ball in the air before it hit the ground? _____
 - e. From what height did the bat hit the ball? _____

3. The area of the rectangle in the diagram below is 170 ft^2 . What is the perimeter of the rectangle?



Hints:

1. Write an equation for the area of the rectangle.
2. Solve the equation.
3. Use the x value to find the perimeter.

4. A rocket is launched upward at an initial velocity, v_0 , of 240 ft/s . The height, $h(t)$, of the rocket is a function of time, t (in seconds), and is given by the formula $h(t) = v_0t - 16t^2$. (Remember velocity is the speed of the object.)
- a. Write the correct formula for the height of the rocket. _____
 - b. How high will the rocket go? _____
 - c. How long will it take to hit the ground? _____
 - d. What is the height after 3 seconds? _____ 14 seconds? _____
 - e. To the nearest 100^{th} of a second, how long does it take the rocket to reach a height of 400 feet? _____
 - f. How many seconds (to nearest 100^{th}) have passed when the rocket reaches 400 feet again? _____
 - g. From what height was the rocket launched? _____

5. The longer leg of a right triangle is 2 cm longer than the shorter leg. The hypotenuse is 4 cm longer than the shorter leg.

- a. How long is the shorter leg?
- b. How long are the other two sides?

6. The longer leg of a right triangle is 5 cm longer than the shorter leg. The hypotenuse is 10 cm longer than the shorter leg.

- a. How long is the shorter leg?
- b. How long are the other two sides?