**4.1 Graphical Solutions of Quadratic Equations**

**Specific Outcome:** Solve, algebraically and graphically, problems that involve systems of linear-quadratic and quadratic-quadratic equations in two variables.

Definitions:

Roots:

Quadratic Equation:

Zero of a Function:

Example 1: **Quadratic Equations With One Real Root**

What are the roots of the equation –*x*2 + 8*x* – 16 = 0?

Your Turn: Determine the roots of the quadratic equation *x*2 – 6*x* + 9 = 0.

Example 2: **Quadratic Equations With Two Distinct Real Roots**

The manager of Jasmine’s Fine Fashions is investigating the effect that raising or lowering dress prices has on the daily revenue from dress sales. The function *R*(*x*) = 100 + 15*x* – *x*2 gives the store’s revenue *R*, in dollars, from dress sales, where *x* is the price change, in dollars. What price changes will result in no revenue?

Your turn: The manager at Suzie’s Fashion Store has determined that the function

*R*(*x*) = 600 – 6*x*2 models the expected weekly revenue, *R*, in dollars, from

sweatshirts as the price changes, where *x* is the change in price, in dollars.

What price increase or decrease will result in no revenue?

Example 3: **Quadratic Equations With No Real Roots**

Solve 2*x*2 + *x* = –2 by graphing.

Your Turn: Solve 3*m*2 – *m* = –2 by graphing.



**Solution**



**Step 1: Solve the equation for its roots when h(0) = 0.**

**Step 2: Subtract the two roots to determine the distances between the two.**

-Key Ideas

**1.**One approach to solving a quadratic equation of the form *ax***2** + *bx* + *c* = 0, *a* ≠ 0, is to graph the corresponding quadratic function, *f (x*) = *ax*2 + *bx* + *c*. Then, determine the *x*-intercepts of the graph.

The *x*-intercepts of the graph, or the zeros of the quadratic function, correspond to the solutions, or roots, of the quadratic equation.

2. The graph of a quadratic function can have zero, one, or two real *x*-intercepts.

Therefore, the quadratic function has zero, one, or two real zeros, and correspondingly the quadratic equation has zero, one, or two real roots. 

Assignment: Pg 215-217 #'s 1,2,4 acf,6,10,15