**Math 20-2: U7L1 Notes**

**Solving Quadratic Equations by Graphing**

**Key Math Learnings:**

**By the end of this lesson, you will learn the following concepts:**

Determine with technology the x-intercepts of the quadratic function

Explain the relationship among the roots of an equation, the zeroes the corresponding function and the x-intercepts of the graph of the function.

Explain, using examples, why the graph of a quadratic function may have zero, one or two x-intercepts.

Solve problems by modelling a situation with a quadratic equation and solving the equation.

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**What is a Quadratic Equation?**

The roots of a quadratic equation are?

What do the words Solutions, Zeroes, and Roots have in common?

**Using a Graphing Calculator to Solve Quadratic Equations**

**Method 1: Solving for the X-intercepts (Zeroes)**

Using technology might be helpful to solve quadratic equations since it gives you the visual of the graph quite quickly.

**Step 1:** Manipulate the equation to be in standard form.

**Step 2:** Enter the equation into Y1.

**Step 3:** Adjust the window settings until you see the vertex of the parabola and the x-intercepts.

**Step 4:**Use the ZERO command to find the roots -- 2nd TRACE (CALC), #2 zero

**Step 5:***Left bound?* Move the spider as close to the root (where the graph crosses the x-axis) as possible. Hit the left arrow to move to the "left" of the root. Hit ENTER. A "marker" \_ will be set to the left of the root.

**Step 6:** *Right bound?* Move the spider as close to the root (where the graph crosses the x-axis) as possible. Hit the right arrow to move to the "right" of the root. Hit ENTER. A "marker" \_ will be set to the right of the root.

**Step 7:** *Guess?* Just hit ENTER

**Step 8:** Repeat the entire process to find the second root

**Using a Graphing Calculator to Solve Quadratic Equations**

**Method 2 -- Solving for the Points of Intersection**

When the quadratic is not in standard form you can use a different method for solving the equation. Summarize the steps below:

**Example**

Solve the equation by graphing the corresponding function and determining the zeros.





**Example**

Solve the equation by graphing the corresponding function and determining the zeros.





**Example**

Solve the equation by graphing the corresponding function and determining the zeros.



**Example**

A ball is thrown into the air from a bridge that is 14 m above a river. The function that models the height, *h*(*t*), in metres, of the ball over time, *t*, in seconds is

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**a)** When is the ball 16 m above the water?

**b)** When is the ball 12 m above the water? Explain.

**c)** Is the ball ever 18 m above the water? Explain how you know.

**d)** When does the ball hit the water?

**Example**

Solve the equation by graphing the corresponding function and determining the zeros.

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**SUMMARY**

• A quadratic equation is

• If a quadratic equation is in standard form

 **–** you can:

• If the quadratic function is not in standard form

 **–** you can graph the expression on the:

 **–** the *x*-coordinates of the

• For any quadratic equation, there can be: