Math 11 Pre-Calculus LG 5

QUADRATIC FUNCTIONS

INTRODUCTION:

Quadratic functions are used in many activities to describe an arcing motion. In Physics, the motion of any projectile moving through the air can be explained using a quadratic equation. By the end of this learning guide you will understand what a quadratic function looks like when it is graphed, and you will be able to describe some characteristics of the graph from the equation.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:

1) analyze and graph quadratic functions and identify the vertex, domain and range, *x* and *y* intercepts, axis of symmetry, and direction of opening.
2) convert quadratic functions from standard form to vertex form by "completing the square".

EVALUATION:

You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:

Math 11 Pre-Calc Text

THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Analyze and graph quadratic functions, and identify the vertex, domain and range, *x* and *y* intercepts, axis of symmetry, and direction of opening.

1. Watch and take notes on instructional video on Quadratic Functions.
2. In the Math 11 text, complete the Investigation activity on pages 143-144.
3. Watch and take notes on instructional video on Graphing and Analyzing Quadratic Functions.

4. In the Math 11 text, read and take notes on the material between pages 144-156. Make sure to include the highlighted/bold words.
5. In the Math 11 text, read and take notes between pages 164-172. Complete the Example 1 **Your Turn** section on pages 166-168.


6. Read Key Ideas on pages 156 & 174. In your math journal, explain the difference between **vertex form** and **standard form** for the equation of a **parabola** including a graph and discussion of what happens to the graph when the values of a, p, and q are changed in different ways. Use appropriate terminology in your explanation.


7. Complete the **Check Your Understanding** questions listed below:
   - pages 157-162 #1→10, 12, 14, 16a, and 17
   - pages 174-179 #1, 2, 4→10, 12, 15, and 17


Expectation #2: Convert quadratic functions from standard form to vertex form by "completing the square".


1. Watch and take notes on instructional video on Completing the Square.


2. In the Math 11 text, read and take notes from pages 180-192 making sure to indicate which example you found the easiest to understand.
3. In the Math 11 text, work through Example 2 on pages 187-188. Now complete the **Your Turn** section on page 188.
4. In the Math 11 text, work through Example 3 on pages 188-189. Now complete the **Your Turn** section on page 189.


5. Read Key Ideas on page 192. In your math journal, using an example of your choice, create a step by step set of instructions on **Completing the Square** that can be used by any student who takes Math 11 in the future. (make it easier to read than the textbook)


6. Complete the **Check Your Understanding** questions listed below:
   - pages 192-197 #1→16, 22, and 23

REVIEW AND CHALLENGE


1. In the Math 11 text, complete the Chapter 3 Review pages 198-200.
2. Complete all Journal activities.

Key terms: quadratic function, parabola, vertex, minimum value, maximum value, axis of symmetry, vertex form, standard form, domain, range, x-intercept, y-intercept, completing the square.

PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4