

Advanced Mathematics 2200
Unit 3: Quadratic Functions

Text: Pre-Calculus 11

Chapter 3

By the end of this unit, it is expected that students will:

Outcome	Text Book
<p>1. Analyze quadratics of the form $y = a(x - p)^2 + q$ and determine the:</p> <ul style="list-style-type: none"> • vertex • domain and range • direction of opening axis of symmetry • x and y intercept <ul style="list-style-type: none"> • Explain why a function given in the form $y = a(x - p)^2 + q$ is a quadratic function. • Compare the graphs of a set of functions of the form $y = ax^2$ to the graph of $y = x^2$, and generalize, using inductive reasoning, a rule about the effect of a. • Compare the graphs of a set of functions of the form $y = (x - p)^2$ to the graph of $y = x^2$, and generalize, using inductive reasoning, a rule about the effect of p. • Compare the graphs of a set of functions of the form $y = x^2 + q$ to the graph of $y = x^2$, and generalize, using inductive reasoning, a rule about the effect of q. • Determine the coordinates of the vertex for a quadratic function of the form $y = a(x - p)^2 + q$, and verify with or without technology. • Generalize, using inductive reasoning, a rule for determining the coordinates of the vertex for quadratic functions of the form $y = a(x - p)^2 + q$. • Sketch the graph of $y = a(x - p)^2 + q$, using transformations, and identify the vertex, domain and range, direction of opening, axis of symmetry and x- and y-intercepts. • Explain, using examples, how the values of a and q may be used to determine whether a quadratic function has zero, one or two x-intercepts. • Write a quadratic function in the form $y = a(x - p)^2 + q$ for a given graph or a set of characteristics of a graph. 	<p>Section 3.1 Pages 142 - 162</p>

<p>2. Analyze quadratics of the form $y = ax^2 + bx + c$ and determine the:</p> <ul style="list-style-type: none"> • vertex • domain and range • direction of opening axis of symmetry • x and y intercepts <p>and to solve problems.</p> <ul style="list-style-type: none"> • Determine the characteristics of a quadratic function given in the form $y = ax^2 + bx + c$, and explain the strategy used. • Sketch the graph of a quadratic function given in the form $y = ax^2 + bx + c$. • Explain the reasoning for the process of completing the square as shown in a given example. • Write a quadratic function given in the form $y = ax^2 + bx + c$ as a quadratic function in the form $y = a(x - p)^2 + q$ by completing the square. • Identify, explain and correct errors in an example of completing the square. • Verify, with or without technology, that a quadratic function in the form $y = ax^2 + bx + c$ represents the same function as a given quadratic function in the form $y = a(x - p)^2 + q$. • Write a quadratic function that models a given situation, and explain any assumptions made. • Solve a problem, with or without technology, by analyzing a quadratic function. 	<p>Section 3.2 Pages 163 – 179</p> <p>Section 3.3 Pages 180 – 200</p>
<p>< Review</p> <p>< Practice Test</p>	<p>Pages 198 – 200</p> <p>Pages 201 – 203</p>