Quadratic Functions and Equations

College Algebra

Main Ideas

- A quadratic function has a x^2 term.

- The graph of a quadratic function is a parabola.

- The maximum point or minimum point of a parabola is called the vertex.

- Solve a quadratic equation by using the quadratic formula.

Quadratic Functions

Definition – Quadratic Function

A quadratic function has the form $f(x) = ax^2 + bx + c$ where $a \neq 0$.

Fact and Definitions– The Graph of a Quadratic Function

- The graph of the quadratic function $y = f(x) = ax^2 + bx + c$ is a parabola.

- If $a > 0$, the graph is concave up and opens upwards.

- If $a < 0$, the graph is concave down and opens downward.

How To – Find the Vertex of a Parabola

The point on the parabola $y = ax^2 + bx + c$ is the point where the graph changes from increasing to decreasing or from decreasing to increasing is called the vertex. To find the x-coordinate of the vertex of a parabola, use the formula $x = \dfrac{-b}{2a}$. Use the equation to calculate the y-coordinate.

Quadratic Equations

How To – Solve a Quadratic Equation

To solve the equation $ax^2 + bx + c = 0$, use the quadratic equation below.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$