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.

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