

Chapter 7 Quadratic Formulas and Parabolas

To solve a quadratic equation in the form $ax^2 + bx + c = 0$ (where $a \neq 0$) use the quadratic formula:

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

$b^2 - 4ac$ is called the **Discriminant**

Parabolas: Standard Form
(Vertex Form)

$$y = a(x - h)^2 + k$$

If “a” is positive the parabola opens up and has a minimum value.

If “a” is negative the parabola opens down and has a maximum value.

$|a| = 1$ normal width

$|a| > 1$ narrow width (vertical stretch)

$|a| < 1$ wider width (vertical shrink)

vertex (h, k)

axis of symmetry: $x = h$

The maximum is the “y” value of the vertex if the parabola opens down.

The minimum is the “y” value of the vertex if the parabola opens up.

Parabolas: General Form

$$f(x) = ax^2 + bx + c \quad (\text{where } a \neq 0)$$

To find the intercepts of a parabola (where the parabola crosses the x-axis), replace $f(x)$ or “y” with 0 (zero) and solve for x using factoring or the quadratic formula.

Changing the values of “h” and “k” creates a “slide translation”. Please see the [Parabola Animations](#) for examples. Click on the link or type the web address:

http://www.clausentech.com/lchs/dclausen/algebra2/lecture_notes/conics/parabola_animations.htm

