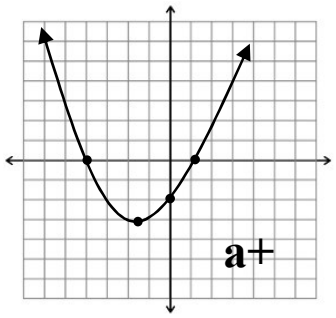
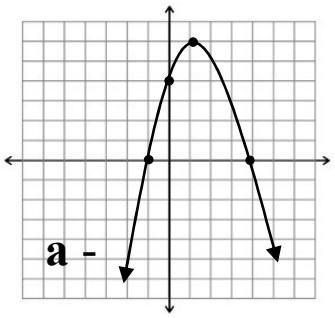
Quadratic Functions

$y = ax^2 + bx + c$ standard form
$y = a(x - h)^2 + k$ vertex form
$y = a(x - r_1)(x - r_2)$ root form





The leading coefficient **a** tells you whether the curve opens up or down.

The constant **c** tells you where the curve crosses the y – axis.

Does the function open up or down? Where does it cross the y-axis?

1. $y = x^2 + 8x - 3$
2. $y = 2x^2 - 6x + 5$
3. $y = -3x^2 - 30x + 11$
4. $y = -4x^2 + 16x - 5$

How many **solutions** does each equation have?
Set the equation equal to 0. Graph it to see where the x-intercepts are or solve by factoring.

1. $x^2 + 2x + 8 = 0$
2. $3x^2 - 3x = 4$
3. $x^2 = 5x + 5$
4. $2y^2 - 4y = -2$
5. $20x = x^2 + 100$
6. $-x^2 + 7x - 15 = 0$

The **maximum** or **minimum** is at the **vertex**. **(h, k)** is the vertex of the parabola.

Find the vertex for each function. Is it a minimum or a maximum?

1. $y = (x - 5)^2 + 3$
2. $y = \frac{1}{2}(x + 1)^2 + 4$
3. $y = -2(x - 1)^2 - 2$
4. $y = -(x - 3)^2 - 1$

The **roots** or zeros are the x-intercepts. The **vertex** is located halfway between the roots

Find the roots by factoring. What is the x-coordinate of the vertex?

1. $y = x^2 + 10x + 24$
2. $y = x^2 - 3x - 10$
3. $y = x^2 - 4x$
4. $y = x^2 - 16$