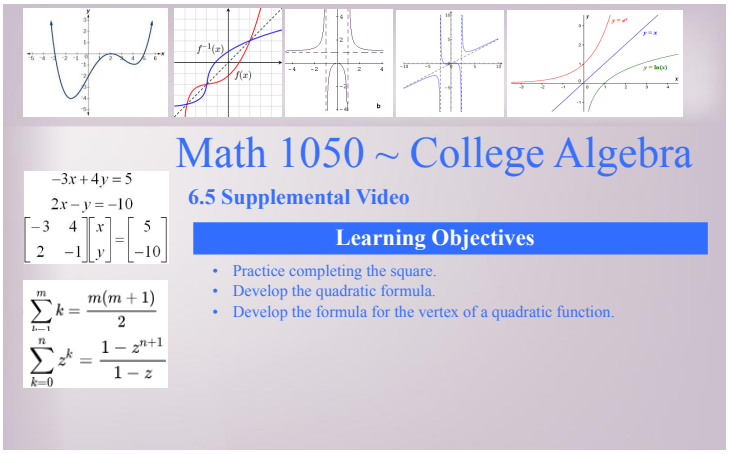


Completing the Square

For a good explanation of how to complete the square, see

http://www.mathsisfun.com/algebra/completing-square.html

This is useful in solving a quadratic equation and in putting that equation in standard form.

Ex 1: Solve by completing the square.

a) $x^2 - 6x - 3 = 0$ b) $3x^2 - 6x - 9 = 0$ c) $2x^2 - 5x + 4 = 0$

Ex 2: Put these equations in standard form. $y = a(x-h)^2 + k$

a) $y = x^2 + 2x - 2$ b) $y = 2x^2 - 4x - 3$ c) $y = -\frac{1}{2}x^2 - 3x + 5$

Deriving the Quadratic Formula

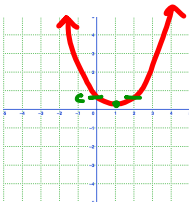
If $ax^2 + bx + c = 0$, $a \neq 0$, then $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Ex 3: Solve this equation for x, if a, b and c are constants.

$ax^2 + bx + c = 0$

Deriving the Formula for the Vertex

The vertex of $f(x) = ax^2 + bx + c$ is at the point $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$.



Ex 4: Determine the vertex for each of these using the above method.

a) $y = x^2 + 2x - 2$ b) $y = 2x^2 - 6x - 3$ c) $y = -\frac{1}{2}x^2 - 3x + 5$