

## Math 10H: How to Complete the Square:

“Completing the Square” is a process to convert a quadratic equation from general form to standard form

$$\boxed{y = ax^2 + bx + c} \quad \rightarrow \quad \boxed{y = a(x - p)^2 + q}$$

Ex: Complete the square:  $y = 3x^2 + 12x - 10$

$$y = 3x^2 + 12x - 10$$

$$y = (3x^2 + 12x) - 10$$

Bracket the first 2 terms, leave the 3<sup>rd</sup> term

$$y = 3(x^2 + 4x) - 10$$

Factor out "a" from the first two terms

$$y = 3(x^2 + 4x + 4 - 4) - 10$$

Add and Subtr. the square of the second coefficient:  $(\frac{1}{2}b)^2$

$$y = 3(x^2 + 4x + 4) - 12 - 10$$

Take out the negative value from brackets, remember to multiply with coefficient in front

$$y = 3(x + 2)(x + 2) - 22$$

Factor trinomial into 2 similar binomial

$$y = 3(x + 2)^2 - 22$$

Combine binomials into a square

The quadratic formula is now in standard form:  $y = a(x - p)^2 + q$