## **Completing the Square Notes**

Some quadratic equations in the form of  $ax^2 + bx + c = 0$  can be solved easily by factoring. For example, the equation  $x^2 + 6x - 16 = 0$  can be factored easily to (x + 8)(x - 2) = 0 to give solutions of x = -8 and x = 2

When a quadratic equation cannot be factored using integers, you have two options. You can use the quadratic formula of you can use a method called **completing the square**. When a = 1, completing the square is the way to go (when a > 1, use the quadratic formula).

Example 1: Solve  $x^2 + 8x - 10 = 0$  by completing the square.

Since it cannot be factored using integers, Write the equation in the form	$x^2+8x-10=0$
$ax^2 + bx = -c$	2 . 0 10
	$x^- + 8x = 10$
Find $\frac{1}{b}$ of <b>b</b> and add the square of that	Think $b = 8$
$\frac{2}{\left(\frac{b}{2}\right)^2}$ to both sides of the equation	$\frac{1}{2}b = 4$ and $4^2 = 16$
2	$x^2 + 8x = 10$
	$x^2 + 8x + 16 = 10 + 16$
The left side is now a perfect square trinomial (PST), so factor it.	(x+4)(x+4) = 26
	$(x+4)^2 = 26$
Find the square root of each side.	$(x+4)^2 = 26$
	$x+4=\pm\sqrt{26}$
Solve for x	$x = -4 \pm \sqrt{26}$
Use a calculator to approximate the solutions, if necessary	$x \approx -4 \pm 5.099$
	$x \approx 1.099 \ or - 9.099$