

Lesson 7.7- Solving Quadratic Equations by Completing the square.notebook February 01, 2018

Lesson 7.7- SWBAT solve quadratic equations by completing the square.

Kick off- Solve each of the following:

1) Solve by factoring:

$$x^2 = 36$$

$$\frac{x^2}{-36} = \frac{36}{-36}$$

$$x^2 - 36 = 0$$

$$(x-6)(x+6) = 0$$

$$x-6=0 \quad x+6=0$$

$$x=6 \quad x=-6$$

2) Solve by the quadratic formula:

$$4b^2 + 8b + 7 = 4$$

$$4b^2 + 8b + 3 = 0$$

$a=4$
 $b=8$
 $c=3$

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

$$\frac{-(8) \pm \sqrt{(8)^2 - 4(4)(3)}}{2(4)}$$

$$\frac{-8 \pm \sqrt{64 - 48}}{8}$$

$$\frac{-8 \pm 4}{8}$$

$$\frac{-8+4}{8} = \frac{-4}{8} = -\frac{1}{2}$$

$$\frac{-8-4}{8} = \frac{-12}{8} = -\frac{3}{2}$$

Completing the Square- $ax^2 + bx + c = 0$

Example: $x^2 + 11 = 12x$

Steps	Example: $x^2 + 11 = 12x$
1) Put in the form: $ax^2 + bx = c$	$x^2 - 12x + 11 = 0$
2) Add $(\frac{b}{2})^2$ to both sides	$(\frac{-12}{2})^2 = (-6)^2 = 36$ $x^2 - 12x + 36 = -11 + 36$
3) Factor the trinomial	$x^2 - 12x + 36 = 25$ $(x-6)(x-6) = 25$ $\sqrt{(x-6)^2} = \sqrt{25}$
****Take $1/2b$ and make that into: $(x + \frac{1}{2}b)(x + \frac{1}{2}b) = c$	
Write in the form $(x + \frac{1}{2}b)^2 = c$	$x-6 = \pm 5$
4) Square root both sides.	$x-6 = 5$ $x-6 = -5$
5) Write two equations.	$x = 11$ $x = -1$
6) Solve for the variable.	

Solve each of the following by completing the square.

1) $x^2 + 6x - 59 = 0$

$$x^2 + 6x = 59$$

$$x^2 + 6x + 9 = 59 + 9$$

$$(x+3)(x+3) = 68$$

$$\sqrt{(x+3)^2} = \sqrt{68} \rightarrow \sqrt{4 \cdot 17}$$

$$x+3 = \pm 2\sqrt{17}$$

$$x = -3 \pm 2\sqrt{17}$$

2) $a^2 + 14a - 51 = 0$

$$a^2 + 14a = 51$$

$$a^2 + 14a + 49 = 51 + 49$$

$$(a+7)(a+7) = 100$$

$$\sqrt{(a+7)^2} = \sqrt{100}$$

$$a+7 = \pm 10$$

$$a+7 = +10$$

$$a = 3$$

$$a+7 = -10$$

$$a = -17$$

3) $x^2 + 26 = 10x + 8$

4) $x^2 + 4x = -10x + 15$

5) $x^2 - 12x = -23$

6) $x^2 - 10x + 26 = 8$

Homework:

#3 $x = 8$
 $x = 2$

#4 $x = 8$
 $x = -10$