

Lesson 7.6- Solving Quadratic Equations by Completing the square.notebook January 31, 2018

Lesson 7.6- SWBAT solve quadratic equations by completing the square.

Kick off: Solve each of the following:

1) Solve by factoring:
 $m^2 - 5m = 14$
 $-14 -14$
 $m^2 - 5m - 14 = 0$ MP: $-14m^2$
 $(m^2 - 7m)(2m - 14) = 0$
 $m(m-7) + 2(m-7) = 0$
 $(m+2)(m-7) = 0$
 $m+2=0$ $m-7=0$
 $-2-2$ $+7+7$
 $m=-2$ $m=7$

2) Solve by the quadratic formula:
 $2x^2 - 3x = 5$
 $-5 -5$
 $-b \pm \sqrt{b^2 - 4ac}$
 $2a$
 $2x^2 - 3x - 5 = 0$
 $a=2$
 $b=-3$
 $c=-5$
 $-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}$
 $2(2)$
 $3 \pm \sqrt{49}$
 4
 $\frac{3 \pm 7}{4} = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2}$
 $\frac{3-7}{4} = \frac{-4}{4} = -1$

Completing the Square: $ax^2 + bx + c = 0$
 Example: $x^2 + 6x + 5 = 0$

Steps	Example: $x^2 + 6x + 5 = 0$
1) Put in the form: $ax^2 + bx = -c$	$x^2 + 6x = -5$
2) Add $(\frac{b}{2})^2$ to both sides	$(\frac{6}{2})^2 = 3^2 = 9$ $x^2 + 6x + 9 = -5 + 9$
3) Factor the trinomial	$\frac{1}{2}b = 3$ $(x+3)(x+3) = 4$ $(x+3)^2 = 4$
4) Square root both sides. * \pm on the right	$x+3 = \pm 2$
5) Write two equations.	$x+3 = 2$ $x+3 = -2$ $-3-3$ $-3-3$
6) Solve for the variable.	$x = -1$ $x = -5$

Solve each of the following by completing the square.

1) $x^2 - 8x + 15 = 0$
 Step 1: $-15 -15$
 $ax^2 + bx = -c$ $x^2 - 8x + 16 = -15 + 16$
 Step 2: $\frac{1}{2}(-8) = -4$
 Add $(\frac{b}{2})^2$ $x^2 - 8x + 16 = 1$
 Step 3: $\frac{1}{2}(-8)$
 Factor $(x-4)(x-4) = 1$
 $\frac{1}{2}b$ $\sqrt{(x-4)^2} = \sqrt{1}$
 Step 4: $\sqrt{\quad}$ both sides $x-4 = \pm 1$
 * \pm $x-4 = 1$ $x-4 = -1$
 Step 5 and 6: Write equations and solve!
 $+4+4$ $+4+4$
 $x=5$ $x=3$

2) $x^2 - 24 = 10x$
 $+24 +24$
 $ax^2 + bx = -c$ $x^2 - 10x + 25 = 10x + 24 - 10x - 24$
 $x^2 - 10x + 25 = 24 - 24$
 $\frac{1}{2}(-10) = -5$
 $(x-5)(x-5) = 0$
 $\sqrt{(x-5)^2} = \sqrt{0}$
 $x-5 = \pm 0$
 $x-5 = 0$ $x-5 = 0$
 $x=5$ $x=5$

3) $x^2 - 10x + 16 = 0$

4) $x^2 + 2x - 80 = 0$