

Lesson 7.4- Solving Quadratic Equations by the Quadratic Formula.notebook January 26, 2018

Lesson 7.4- SWBAT solve quadratic equations by the quadratic equation.

Key: at - Solve each of the following:

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

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

④ $x = 4$
 $x = \frac{3}{2}$
 ⑨ $x = \sqrt{\frac{10}{5}}$

⑦ $x = -2$
 $x = -\frac{1}{3}$

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Standard form for the quadratic equation: $ax^2 + bx + c = 0$

Steps to Solving with the Quadratic Formula:

- 1) Put the equation in standard form.
- 2) Label a, b and c.
- 3) Substitute a, b and c into the quadratic formula. *****
- 4) Simplify! (using PEMDAS!)

Directions: Use the quadratic equation to solve for the roots.

1) $5x^2 - x - 4 = 0$ 2) $3x^2 + 4x - 1 = 0$

Equation 1:
 $a = 5$
 $b = -1$
 $c = -4$
 $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(5)(-4)}}{2(5)}$
 $x = \frac{1 \pm \sqrt{81}}{10}$
 $x = \frac{1 \pm 9}{10}$
 $x = \frac{10}{10} = 1$ or $x = \frac{-8}{10} = -\frac{4}{5}$

Equation 2:
 $a = 3$
 $b = 4$
 $c = -1$
 $x = \frac{-4 \pm \sqrt{4^2 - 4(3)(-1)}}{2(3)}$
 $x = \frac{-4 \pm \sqrt{28}}{6} = \frac{-4 \pm 2\sqrt{7}}{6}$

3) $x^2 + 2x = 4$ 4) $8a^2 - 50 = 0$

Equation 3:
 $x^2 + 2x - 4 = 0$
 $a = 1$
 $b = 2$
 $c = -4$
 $x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-4)}}{2(1)}$
 $x = \frac{-2 \pm \sqrt{20}}{2}$
 $x = \frac{-2 \pm 2\sqrt{5}}{2}$
 $x = -1 \pm \sqrt{5}$

Equation 4:
 $8a^2 - 50 = 0$
 $a = 8$
 $b = 0$
 $c = -50$
 $a = \frac{0 \pm \sqrt{0^2 - 4(8)(-50)}}{2(8)}$
 $a = \frac{0 \pm \sqrt{1600}}{16}$
 $a = \frac{\pm 40}{16}$
 $a = \frac{40}{16} = \frac{5}{2}$ or $a = \frac{-40}{16} = -\frac{5}{2}$

5) $x^2 + 6x + 10 = 14$ 6) $y^2 + 4 = -6y$

7) $2m^2 - 12 = -2m$ 8) $4b^2 + 8b + 7 = 4$

$$9) x^2 + 2x - 1 = 2$$

$$10) 5r^2 = 80$$