

Lesson 2.3- SWBAT solve quadratics using completing the square and the quadratic equation.

Kickoff

In your homework packet, complete questions 4, 6, 8!

4) $-25p^4 + 160p^2 + 320$

$-5(5p^4 - 32p^2 - 64)$

$-5(+5p^4 - 40p^2) + (8p^2 - 64)$

$(5p^2(p^2 - 8) + 8(p^2 - 8))$

$\rightarrow -5(5p^2 + 8)(p^2 - 8)$

11) $(x^5 + x^4)(-7x^3 - 7x^2)(12x + 12)$

$x^4(x+1) - 7x^2(x+1) 12(x+1)$

$(x+1)(x^4 - 7x^2 + 12)$

$(x+1)(x^2 - 4)(x^2 - 3)$

$(x+1)(x-2)(x+2)(x^2-3)$

$9n^2 + 58n - 24$ $8)x^2 - 216y^2$
 $-9n^2(-24) = 216n^2$ $(x-6y)(x^2+6y+36y^2)$
 $-9n^2 + 54n^2 + 24n^2 = 24$
 $-9n^2(n^2-6) + 24(n^2-6)$
 $(-9n^2+24)(n^2-6)$
 $-1(9n^2-24)(n^2-6)$

9) $2x^4 - 6x^2y^2 + 108y^4$
 $2(x^4 - 3x^2y^2 + 54y^4)$
 $-54y^4y^4$
 $2(x^4 - 9y^4)(6y^2 - 54y^4)$
 $x^2(x^2 - 9y^2)(6)(x^2 - 9y^2)$
 $2(x^2 + 6y^2)(x^2 - 9y^2)$
 $2(x^2 + 6y^2)(x-3y)(x+3y)$

$x^2 + 5x - 6$ $\frac{2,3}{-1,6}$
 $(x-1)(x+6)$

Solving Quadratics by Completing the Square and the Quadratic Formula

What is the standard form of a quadratic equation? $ax^2 + bx + c = 0$

Put the quadratics in standard form and identify a, b, and c.

1. $3x^2 + 5x - 2 = 0$	2. $x^2 = -2x + 7$	3. $x^2 + 6x = 15$
$a=3$	$x^2 + 2x - 7 = 0$	$x^2 + 6x - 15 = 0$
$b=5$	$a=1$	$a=1$
$c=-2$	$b=2$	$b=6$
	$c=-7$	$c=-15$

Solving Quadratics by Completing the Square

- Put in the form $x^2 + bx = C$
 $\neq a$ value = 1
- Take $(\frac{1}{2}b)^2$ and add to both sides
- factor the trinomial
 (both are the same)
- Rewrite $()^2 = \#$
- Square Root *don't forget \pm
- Solve + reduce!

Examples:

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

$\frac{1}{2}(-4) = -2 \rightarrow (-2)^2 = 4$

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

$x^2 + 4x + 4 = 2 + 4$

$(x+2)(x+2) = 6$

$\sqrt{(x+2)^2} = \sqrt{6}$

$x+2 = \pm\sqrt{6}$

$-2 \quad -2$

$x = -2 \pm \sqrt{6}$

2) $2x^2 - 5 = 3x$

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

Solving Quadratics using the Quadratic Formula

- 1) Put in the form $ax^2 + bx + c = 0$
- 2) identify a, b and c
- 3) plug a, b and c into formula
- 4) Simplify
- 5) Reduce

Examples:

1) $2x^2 - 4x - 1 = 0$ 2) $x^2 = 6x + 3$

$a = 2$ $b = -4$ $c = -1$

$$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-1)}}{2(2)}$$

$$\frac{4 \pm \sqrt{16 + 8}}{4}$$

$\sqrt{4} = 2$

$$\frac{4 \pm \sqrt{24}}{4}$$

$$\frac{4 \pm 2\sqrt{6}}{4} = \frac{4}{4} \pm \frac{2\sqrt{6}}{4}$$

$$1 \pm \frac{\sqrt{6}}{2}$$

Practice: Solve each of the following quadratic equations by completing the square.

1) $x^2 + 14 - 15 = 0$ 2) $x^2 + 6x = -8$

Solve each of the following quadratic equations by using the quadratic formula.

5) $3v^2 = 8v + 128$ 6) $-5n^2 = -18 - 3n$

Solve each of the following quadratic equations using factoring when possible. Otherwise, use the quadratic equation.

9) $3t^3 + 375 = 0$ 10) $9r^2 + 7r + 8 = -4 + 8$