Bellwork: Algebra 1

1. Welcome back! Happy Monday :)
2. Write down your work for the week in your planner.
3. Get your Algebra Nation workbook.
4. You need a calculator.
5. Answer the following question on your MONDAY Bellwork:

Simplify the following:

$\sqrt{144} = \{-12, 12\}$ $\sqrt{20}$

$\sqrt{20}$

$\sqrt{4}\ \sqrt{5}$

$\pm 2\sqrt{5}$

$\sqrt{9} = \{-3, 3\}$ $\sqrt{48}$

$\sqrt{48}$

$\sqrt{16}\ \sqrt{3}$

$\pm 4\sqrt{3}$

$\sqrt{48}$

$\sqrt{4} \cdot \sqrt{12}$

$2\ \sqrt{4}\sqrt{3}$

$2 \cdot 2\sqrt{3}$

$\pm 4\sqrt{3}$

Solving Quadratic Equations by Factoring – Special Cases

p. 132

$x^2 = x \cdot x$

There are a few special cases when solving quadratic equations by factoring.

Perfect Square Trinomials:

- $x^2 + 6x + 9$ is an example of a ***perfect square trinomial***. We see this when we factor.

	x	3
x	x^2	$3x$
3	$3x$	9

$9x^2$, $3x$, $3x$, $6x$

- A perfect square trinomial is created when you square a ~~binomial~~.

$(x+3)(x+3)$

$(x+3)^2 \neq x^2 + 9$

Recognizing a Perfect Square Trinomial:

A quadratic expression can be factored as a perfect square trinomial if it can be re-written in the form $a^2 + 2ab + b^2$.

Factoring a Perfect Square Trinomial:

- If $a^2 + 2ab + b^2$ is a perfect square trinomial, then $a^2 + 2ab + b^2 = (a + b)^2$.
- If $a^2 - 2ab + b^2$ is a perfect square trinomial, then $a^2 - 2ab + b^2 = (a - b)^2$.

1. Determine whether $16x^2 + 88x + 121$ is a perfect square trinomial. Justify your answer.

a^2

$a = 4x$

$b = 11$

$2ab = 2(4x)(11) = 88x$

$(4x+11)^2$

2. Solve for q: $q^2 - 10q + 25 = 0$.

b^2

$a = q$

$b = 5, -5$

$2ab = 2(q)(-5) = -10q$

$(a+b)^2$

$(q-5)^2$

3. Determine whether $x^2 - 8x + 64$ is a perfect square trinomial. Justify your answer.

$a = x$

$b = 8, -8$

$2ab = 2(x)(-8) = -16x$

4. Solve for w: $4w^2 + 49 = -28w$.

$4w^2 + 28w + 49 = 0$

$a = 2w$

$b = 7$

$2ab = 2(2w)(7) = 28w$

$\sqrt{(2w+7)^2} = \sqrt{0}$

$2w + 7 = 0$

$-7 \quad -7$

$\frac{2w}{2} = \frac{-7}{2}$

$w = -\frac{7}{2}$

5. What do you notice about the number of solutions to the perfect square quadratic equations?

6. Sketch the graph of a quadratic equation that is a perfect square trinomial.

Difference of Squares:

Use the distributive property to multiply the following binomials.

$(x + 5)(x - 5)$

$(5x + 3)(5x - 3)$

Describe any patterns you notice.

Let's Practice!

7. Solve the equation $49k^2 = 64$ by factoring.

Try It!

8. Solve the equation $0 = 121p^2 - 100$.

BEAT THE TEST!

1. Which of the following expressions are equivalent to $8a^3 - 98a$? Select all that apply.

- ☐ $2(4a^3 - 49a)$
- ☐ $2a(4a^2 - 49)$
- ☐ $2a(4a^3 - 49a)$
- ☐ $(2a - 7)(2a + 7)$
- ☐ $2(2a - 7)(2a + 7)$
- ☐ $2a(2a - 7)(2a + 7)$

Section 5 – Topic 6
Solving Quadratic Equations by Taking Square Roots

Consider the following quadratic equation.

$$2x^2 - 36 = 0$$

When quadratic equations are in the form $ax^2 + c = 0$, solve by taking the square root.

Step 1: Get the variable on the left and the constant on the right.

Step 2: Take the square root of both sides of the equation. (Don't forget the negative root!)

$(2x)^2 = 2 \cdot x \cdot x$

$(2x)^2 = (2x)(2x)$

$= 4x^2$

Solve for x by taking the square root.

$2x^2 - 36 = 0$

$+36 \quad +36$

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

$\sqrt{x^2} = \sqrt{18}$

$\sqrt{18}$

$\sqrt{9}\sqrt{2}$

$3\sqrt{2}$

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

Let's Practice!

1. Solve $x^2 - 121 = 0$.

$+121 \quad +121$

$\sqrt{x^2} = \sqrt{121}$

$x = \{-11, 11\}$

Try It!

2. Solve $-5x^2 + 80 = 0$.

$-80 \quad -80$

$\frac{-5x^2}{-5} = \frac{-80}{-5}$

$\sqrt{x^2} = \sqrt{16}$

$x = \{-4, 4\}$

BEAT THE TEST!

1. What is the smallest solution to the equation $2x^2 + 17 = 179$?

   (A) -9
   (B) -3
   (C) 3
   (D) 9