9th Grade Assignment – Week #24

Group Assignment:

For Tuesday

- Do Problems #1-8 from **Problem Set #1** of the *Quadratic Formula* unit. (Note: for now, we are skipping the *Fractions and Square Roots* unit.)

For Thursday

1) There are five coins – two of one type, and three of another type. These coins are in a line as shown here.

The objective is to move them in such a way that they end up still in a contiguous line of five, but that the two black coins are side-by-side, and the three white coins are also side-by-side. The rule is that you must move two coins at a time, and those two coins must be touching each other the entire time that you are moving them. (No, you can't push them together to get rid of any gaps.)

a) What is the fewest number of moves in which this is possible?

2) Find the sum of all the numbers from 1 to 1000 that are multiples of either 5 or 3.

Individual Work

- After Tuesday's group work, do the rest of **Problem Set #1** (from the *Quadratic Formula* unit): problems #9-21.

The Quadratic Formula

Problem Set #1

Group Work

At the end of the *Factoring* unit you were given the following problem to solve:

$$x^2 + 6x = 3$$

However, at that time, you were not able to solve it. (Can you see why?) One of the goals of this new unit is to be able to solve problems like this, and to develop a formula, called the *Quadratic Formula*, that allows us to easily solve these problems. We will now take the first step toward this goal.

Absolute Values

Loosely speaking, taking the *absolute value* of a number makes the negative sign "go away". Here are some examples:

$|-7| \rightarrow 7$

$|-4| \rightarrow 4$

$|5| \rightarrow 5$

Furthermore, we can solve equations with absolute values in them, such as:

$|x| = 5 \rightarrow x = 5, -5$

$|x+3| = 7 \rightarrow x = 4 \text{ or } -10$

Solve.

1) $|x - 4| = 9$

2) $|x + 8| = 12$

3) $|x - 3| + 2 = 6$

Making Perfect Squares

The trinomial $x^2 - 10x + 25$ is called a *perfect square* because it happens to factor to a squared binomial: $(x-5)^2$.

Fill in the blank in order to create a perfect square trinomial.

Example: $x^2 + 8x + \_\_\_$

Solution: 16 goes in the blank because $x^2+8x+16$ factors to $(x+4)^2$.

4) $x^2 + 6x + \_\_\_$

5) $x^2 + 14x + \_\_\_$

6) $x^2 - 12x + \_\_\_$

7) $x^2 + \_\_\_ + 100$

Greek Geometric Puzzles

8) A rectangle has a length of 8 inches and a height equal to the length of the side of a square. Find the length of the side of the square such that the sum of the areas of the two figures is 65 square inches.

Homework

Complete the Square.

Fill in the blank in order to create a perfect square trinomial.

9) $x^2 + 4x + \_\_\_$

10) $x^2 - 18x + \_\_\_$

11) $x^2 - 2x + \_\_\_$

12) $x^2 + 5x + \_\_\_$

13) $x^2 + \_\_\_ + 36$

Solve.

14) $|3x + 5| = 2$

15) $|3x| + 5 = 2$

16) $|x + 5| = 1$

17) $|x - 3| = 7$

18) $|x| - 3 = 7$

19) $|\frac{1}{2}x - 5| + 3 = 11$

Word Problems.

20) The sum of two numbers is 32. The larger number is 12 more than twice the smaller number. Find the numbers.

21) The sum of the two numbers is 13, and the difference of their squares is 39. Find the numbers.