9th Grade Assignment – Week #17

<u>Individual Work</u>

- *Important!* Before Thursday's group meeting, you need to write 2 two-riddle problems. You will then bring these to share with your group.
- Do these problems:
    - **Problem Set #1** from the *Word Problem* unit: #22, 24
    - **Problem Set #3** from the *Word Problem* unit: problems #7-11

<u>Group Assignment</u>:

For Tuesday:
    - **Problem Set #1** from the *Word Problem* unit: problems #21, 23
    - **Problem Set #2** from the *Word Problem* unit: problems #5
    - **Problem Set #3** from the *Word Problem* unit: problems #1-5

For Thursday:
    - Share your two-number riddles with others in the group. Just give the others your two hints, and then they try to solve it.
    - If time allows, do these problems:
        - **Problem Set #3** from the *Word Problem* unit: problems #6
        - **Problem Set #4** from the *Word Problem* unit: problems #1-6

Word Problems

Problem Set #1

Group Work

Relating numbers.

If we are given two numbers, then we can make statements (in either English or algebra) that relate the numbers.

Example: 6 and 10

Possible statements:

- One number is four greater than the other; $x = y + 4$
- One number is $^3/_5$ of the other; $y = {}^3/_5\, x$
- The difference of the two numbers is four; $x - y = 4$
- The larger number is eight less than three times the smaller; $x = 3y - 8$

Give at least five statements (in both English and algebra) that relate each pair of numbers.

1) 7 and 3
2) 4½ and 9
3) 8 and 13

Homework

Translate into Algebra.

4) Seven more than twice a number.
5) One number is two more than five times another.

6) Six less than half a number.
7) Half of six less than a number.
8) The sum of two numbers.
9) The sum of two numbers is 18.
10) The product of two numbers is 18.
11) The square of three less than a number.

Translate into English.
(Try to avoid using the words "plus", "minus", "equals", "x", "y", etc.)

12) $6x - 3$
13) $6(x - 3)$
14) $x^2 + 5$
15) $x^2 + y^2$
16) $(x+y)^2$
17) $y = x^2 + 5$
18) $4x - 1 = 5$
19) $x + y = 7$
20) $y - x = 7$

Find the Number.

21) Four more than three times a number is 22.
22) Eight less than three times a number is six.
23) Half a number is twelve less than twice that number.
24) The square of a number is 14 more than five times that number.

Problem Set #2

<u>Group Work</u>
Find the Number.

1) Eight more than three times a number is four.
2) One-half of three less than a number is six.
3) Four less than eight times a number is 37.
4) Consider these statements:
   - The sum of two numbers is 13.
   - The larger number is three greater than the smaller.
   - The larger of two numbers is one more than three times the smaller.

a) This statement: "The smaller number is three less than the larger" is equivalent to which of the above statements?

b) How many possible solutions are there to the first statement alone?

c) How many possible solutions are there to the second statement alone?

d) How many possible solutions are there that satisfy both the first and second statements?

e) How many possible solutions are there that satisfy both the first and third statements?

f) How many possible solutions are there that satisfy both the second and third statements?

g) How many possible solutions are there that satisfy all three statements?

Two-number Riddles

5) Solve this riddle:
   The smaller of two numbers is four less than the larger. The larger is one less than twice the smaller.

6) Make your own two-number riddle! Start by choosing two numbers (between 1 and 20). Make two statements about your two numbers.

<u>Homework</u>
The homework problems should be selected from the two-number riddles that the class has made up!

Problem Set #3

Group Work

1) With the equation
$$y = 5x - 7$$
   a) Find y when x is 4.
   b) Find y when x is $-3\frac{1}{2}$.
   c) Find x when y is 4.

2) With the equation
$$4x + 3y = 12$$
   a) Find x when y is 2.
   b) Find x when y is -7.
   c) Find y when x is $-\frac{3}{4}$.

3) Give three solutions to
$$y = 2x - 3.$$

4) Give three solutions to
$$5x - 3y = 4.$$

5) Find a solution that works for both $y = 2x - 3$
and $5x - 3y = 4$.

6) *Challenge Problem!*
Here are four statements:
   1. The sum of two numbers is seven.
   2. The larger number is twice the smaller.
   3. Three times the larger number is 35 greater than four times the smaller.
   4. The larger number is one more than the square of the smaller.

   How many two-number riddles can you create by selecting any two of the above statements? Solve each one!

Homework

7) Eight more than ten times a number is 120. Find the number.

8) The square of a number is 21 less than ten times that number. Find the number.

9) In a basketball game, the Tigers beat the Apes by 18 points. Twice the Tigers' score was six less than three times the Apes' score. What was the Tigers' score?

10) Given $y = \frac{2}{3}x + 4$
    a) Find y when x is 6.
    b) Find x when y is -7.
    c) Find y when x is $-\frac{3}{4}$.

11) Give three solutions to
$$x + 2y = 7.$$

***Three two-number riddles, written by students, should be added here!

Problem Set #4

Group Work
Find the numbers.
1) The sum of two numbers is 17 and the sum of their squares is 185.

2) The difference of two numbers is 16. Four times the smaller number is 13 less than three times the larger number. What are the numbers?

3) The sum of two consecutive integers is 31.

4) The sum of two odd consecutive integers is 48.

5) The sum of two even consecutive integers is 34.

6) Find the common solution:
$$y = 2x + 7$$
$$3x + 4y = 6$$

Homework
Section A
Find the numbers.
7) The sum of two numbers is 210 and their difference is 40.

8) Two consecutive integers are such that four times the smaller is four more than 3 times the larger.

9) The product of two numbers is 80 and one number is one more than three times the other.

Find the common solution to each pair of equations.

10) $y = x + 2$
$y = 2x - 1$

11) $2x + y = 5$
$x + y = 4$

12) $5x + 3y = 1$
$x - 3y = 9$

Section B
Find the numbers.
13) The sum of two numbers is 335. The larger number is 40 less than twice the smaller.

14) Together a coffee and a donut cost $3.35. The donut costs 40¢ less than twice the price of the coffee. Find the price of the donut.

Find the common solution to each pair of equations.

15) $y = 2x + 4$
$3y - 5x = 9$

16) $x = 4y + 1$
$3y + 2x = 7$

17) $5x - y = 3$
$2y - x = 12$