Math4010 Problem Set 4

Due date:_____

Please attach the appropriate cover sheet to your assignment when you turn it in. Remember that it must be stapled and also that you cannot turn this in late! **To get full credit, you must have neat work, show all work, and <u>circle or box all answers</u>!!**

(1) (10 points) If it takes Betty 5 hours to walk 9 miles, how far will she have walked in 3 hours? (Assume that she walks at a constant rate.)

(2) (10 points) Mary was making a skirt. She had $3\frac{2}{5}$ yards of material. She used $\frac{3}{4}$ of the material for the main part of the skirt, and then she used $\frac{2}{3}$ of what was left for a stylish belt. How much material was left?

(3) (10 points) John's teacher gave him a large sheet of red construction paper to make paper toys. If John used $\frac{2}{7}$ of the sheet for a cart and $\frac{3}{5}$ of the sheet for a tent, what fraction of the sheet of paper was left?

(4) (10 points) Three-sevenths of a class is girls. If there are 20 boys in the class, how many girls are in the class?

(5) (10 points) If $\frac{5}{8}$ of a pound of apples cost \$2.35, how much would $1\frac{1}{2}$ pounds of these apples cost?

(6) (10 points) Five rectangular cakes are to be divided into portions with each portion being $\frac{3}{5}$ of a cake. How many portions are possible?

(7) (10 points) If the ratio of girls to boys in a class is 4 to 5 and there are 25 boys, girls form what fraction of the class?

(8) (10 points) Katie can mow $\frac{3}{5}$ of the lawn in $\frac{1}{4}$ of an hour. How long will it take Katie to mow the whole lawn?

(9) (10 points) It takes Bill 2 hours to correct the essays that his students wrote in class. The substitute teacher, Dave, takes 3 hours to do the same job. If they both work together until all the essays are corrected, how long will it take to do this job?

(10) (10 points) A teacher uses $\frac{2}{3}$ of her yearly supply of construction paper during the first quarter. She then uses $\frac{5}{7}$ of what's left during the second quarter. During the third quarter, she uses $\frac{3}{4}$ of what she has left (from the end of the second quarter). How much construction paper does the teacher have left for the fourth quarter of the school year?

(11) (10 points) I am a four-digit number divisible by 5. My first three digits are divisible by 4. The sum of my digits is 11. There is a 3 in my hundreds place. Who am I?

(12) (10 points) Using rectangular cakes, show how to carry out each calculation below:

$$\frac{2}{3} + \frac{1}{8} =$$

$$\frac{3}{4} x \frac{5}{6} =$$

(13) (10 points each) From the book: pg 283 (Discussion questions) #1, 2, 3, 7, 8
pg 284 (Chapter 6 Test) #16, 19, 22

(14) Reflection Question: **Must be Typed**. (This focuses more on reflecting *about teaching* than some of the previous reflection questions.)

(a) (10 points) Answer the following multiple choice question yourself first.

Estimate the answer: $\frac{12}{13} + \frac{7}{8} = ?$

(a) 1   (b) 2   (c) 19   (d) 21

This problem was on the 1982 NAEP (National Assessment of Educational Progress). Approximately equal numbers of 13-year-olds taking the test chose each of the four answers. Of the 17-year-olds, only 37% got the correct answer. Describe what might have been the student's thinking in each one of the answers given as choices above. What does this show about their concept of adding fractions? How would you correct the mistaken answers?

(b) (10 points) Consider each of the statements below from real classrooms. Decide if the statement is correct. If it is, explain why. If it is wrong, give a counter example, and then, modify the statement so that it is correct. (Don't just negate statement when correcting it.)
        (i)   "The bigger the denominator, the smaller the fraction."
        (ii)   "When you multiply two numbers together, you always get a bigger number."
        (iii)   "When you divide, you always get a smaller number."

Your write-up and solutions to these problems must be placed in your portfolio. Your Math Methods teacher will expect you to have these there and will talk further about these problems in that class.

As you work problem #1 and 2, keep a record of the questions you ask yourself and/or the problems you run into in your work. Attach your list to the assignment.

1. **For all of the following questions, consider the division calculation, 17 ÷ 5 = 3 R2**

   a. Use this problem to illustrate briefly how division is related to the other three arithmetic operations.

   b. Give word problems for which the best answer in the context of the word problem would be
   - (i)   3 R 2
   - (ii) $3\frac{2}{5}$
   - (iii) 3
   - (iv)   4

   (Solve each problem explaining what the R 2 and $\frac{2}{5}$ mean in the context of the problem.)

   c. Give two different word problems that would result in the above calculation and which would show the two models of division we have discussed in class: partitive and measurement.

2. Respond to each question below: **Type and title it** *"Concepts of Division."*
   a. Why might it be useful to have more than one concept of the operation of division, i.e. partitive and measurement?
   b. One can use different algorithms to carry out a division calculation. Are different "concepts" related to different "algorithms?" If so, explain why.
   c. Using your word problems illustrate what is meant when one says, "division and multiplication are inverse operations."
   d. Which method of division is more readily accessible to children who know how to add and subtract? What are the implications of your answer for developing an understanding of division?