PROBLEM SET 4

Please attempt all problems. Show your work and explain your thinking. You might want to start your work on a piece of scrap paper.

1. (Algebra I: A Process Approach Pg. 57 #3) There are many ways to represent positive and negative numbers. A pebble model uses white pebbles for positive numbers and black pebbles for negative numbers. The value of each pebble is one unit. In a pile of black and white pebbles, each white pebble “cancels” a black one.

For example, one way to represent the number -3 (read “negative three”) is this:

   a. Use the pebble model to show three ways to represent the number -4. (1 point)

   b. Use the pebble model to show three ways to represent the number 5. (1 point)

2. (Algebra I: A Process Approach Pg. 122 #3) (3 points)
   a. Write two other algebraic expressions which are equivalent to -5x + 2.

   b. Evaluate each algebraic expression in (a) for x = 4.

   c. Evaluate each algebraic expression in (a) for x = -2.
3. Calendar Math (*Problem Solving in Mathematics*) Select any month from a calendar. Select any 4 by 4 grid of 16 days. Draw a square around your 4 by 4 grid.

a. Find the sum of each of the two diagonals of your square (see right). (1 point)

b. Find the sum of the four corners. (1 pt.)

c. Find the sum of the inner four numbers. (1 pt.)

d. What pattern do you see with the sums? Can you explain why the pattern occurs? (2 points)

4. Some experts believe that in order to use problem solving as an effective teaching tool, teachers should encourage students to extend the problem they have just solved. In other words, students should look at other cases that fit the same pattern, find ways to describe the pattern in general, or attempt other problems that could be solved using the same approach. For example, in problem 1 from Problem Set #2, parts (b) and (c) are extensions of the problem in part (a).

a. Write another extension for problem 1 from Problem Set #2. (1 point)

b. Write an extension for problem 3 from Problem Set #2. (1 point)

c. In what ways might your ability to create problem extensions help you teach mathematics better? (1 point)
5. a. Write 3 expressions equivalent to $\frac{2}{3}$. (1 pt.)

b. Write 3 expressions equivalent to $5\frac{2}{5}$. (1 pt.)

6. a. Find a fraction between $\frac{1}{3}$ and $\frac{1}{4}$. (1 pt.)

b. Find a fraction halfway between your answer to part (a) and $\frac{1}{3}$. (1 pt.)

7. Which leaves more open space in relationship to the total area of the whole?
   a) A square peg in a round hole, where the diameter of the round hole equals the length of the diagonal of the square peg. OR
   b) A round peg in a square whole, where the length of a side of the square hole equals the diameter of the round peg.
   Explain. (3 points)
8. a. *(Algebra I: A Process Approach Pg. 90 #1)* Solve the following problem in two ways: Hot dogs cost $1.25 and large soft drinks cost $0.75 at the carnival. Jerry has to buy hot dogs and large drinks for eight people. How much money will it cost? (2 points)

   b. *(Algebra I: A Process Approach Pg. 105 #3)* (2 points)
   
   i. What is the area of the shaded portion of the rectangle?
   
   ii. What is the area of the unshaded portion of the rectangle?
   
   iii. What is the area of the entire rectangle?

9. Part I. *(Algebra I: A Process Approach Pg. 126 #3)* Write an expression for the area of each shaded region: (2 points)

   Part II. Write an expression for the amount of fence that would be needed to enclose the shaded area for each figure above. (2 points)

   a.  
   b.  
   c.  

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Writing Assignment #4

A student in your class claims that 2/3 is equivalent to .666666667 because he converted the fraction to a decimal and back to a fraction (using the MATH and FRAC commands). Another student claims that 2/3 is equivalent to .666666667 and a third claims .666667. Are all the students correct? Are any of the students correct? What response (including statements, questions, etc.) would you make as a teacher to help the students understand this situation better? (2 points)