The Thirtual

1. The rectangle shown below contains exactly 72 small congruent “unit squares” arranged in a 3 × 24 array. When all of the border unit squares of the 3 × 24 rectangle are shaded (as shown), 50 of 72 unit squares are shaded and 22 are unshaded.

   Find a rectangle such that when all of the border unit squares are shaded, the number of unit squares that are shaded is equal to the number of unit squares that are unshaded. The rectangle cannot contain more than 100 square units and the side lengths must be positive integers.

   State the dimensions of the rectangle and provide a clear explanation of your solution procedure.

PLEASE NOTE THAT QUESTION 2 IS PRINTED ON BOTH SIDES OF THIS PAGE.

2. In each of the following tasks, all cuts are made perpendicular to opposite sides of the square being cut.

   Part 1: A 4-unit square can be cut into exactly 7 square pieces with no part of the original 4-unit square left over. However, not all of the squares are congruent. Provide a sketch of how the 4-unit square shown below can be cut into exactly 7 square pieces with none of the original 4-unit

Part 2: A 4-unit square can be cut into exactly 11 square pieces with no part of the original 4-unit square left over. However, not all of the squares are congruent. Provide a sketch of how the 4-unit square shown below can be cut into exactly 11 square pieces with none of the original 4-unit square left over AND provide a summary of the dimensions of the 11 smaller squares.

Summary:

Scrap pap(GS8 gs 0 G [(Sc)-3(rap)3(-3(rap)3( )4)3( )4)3( )4 2v

Scrap pap(GS8 gs 0 G [(Sc)-3(rap)3(-3(rap)3( )4)3( )4)3( )4 2v

3. A bag contains 24 number tiles. Twelve of the tiles are numbered "9" and twelve of the tiles are numbered "10." Assume you remove K tiles, $K \quad \{2, 3, \ldots, 24\}$, from the bag and then determine the respective "number tile total." i.e., the sum of all of the numbers on the tiles that you have removed from the bag.

   (a) What is the third largest "number tile total" that CAN BE FORMED with those tiles? Clearly state how many of each type of number tile that was drawn for your solution. Reminder: the "number tile total" is the sum of all of the number tiles that are removed from the bag.

   (b) Using the 24 tiles in the bag what is the largest "number tile total" that CANNOT BE FORMED that is smaller than the largest "number tile total" that can be formed? Clearly explain the reasoning for your solution. Reminder: the "number tile total" is the sum of all of the number tiles that are removed from the bag.