Math 2100 – Spring 2019

Lab 3

Names:

Fractions Part 1

One meaning of fractions is that they represent the number of equivalent parts being considered out of the unit amount; using area models can be a helpful visualization, too.

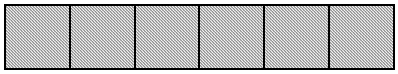
1. When writing a fraction such as $1/3$, we see that two numbers are involved, each having a particular meaning.

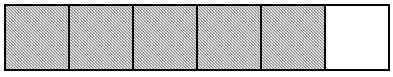
   a. In $1/3$, 3 is called the denominator. What does the 3 represent?

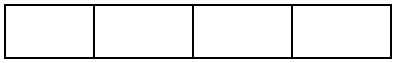
   b. In $1/3$, 1 is called the numerator. What does the 1 represent?

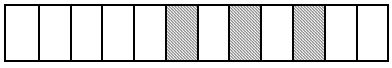
   c. What does the fraction $3/5$ represent?

2. With the fraction-strip model, we assign a value of 1 unit to the entire strip. For each of the following, identify the (unreduced!) fraction represented by the shaded portion of the fraction strip.

a. 

b. 

c. 

d. 

3. Sketch and shade fraction strips to model both of the following fractions. Try your best to draw both strips the same length. Based on your strips, which fraction is bigger?

   a. $7/9$

   b. $4/5$

4. If you were given a fraction strip that did not have any subdivisions marked (like the one pictured below), and you did not own/know how to use a ruler, how would you determine the fractional amount of the bar that is shaded?

Fractions Part 2

1. Next we will use Cuisenaire rods to model fractions. We will use the following abbreviations for the colors:

   W = White; R = Red; G = Light Green; P = Purple; Y = Yellow;

   D = Dark Green; K = Black; N = Brown; B = Blue; O = Orange

   Let O represent 1 unit. Notice two Y's can be placed end-to-end to make the same total length as O.

O	
Y	Y

   a. Y is what fraction of O?

   b. With O as the unit, use your Cuisenaire rods to find the value of each of the following and write the fraction in the space provided. Make a sketch of your picture, modeled on the one above.

W = _____ R = _____ B = _____

2. Now let N be the unit. What color represents each of these fractions?

a. $1/2 =$ _____ b. $1/8 =$ _____

c. $1/4 =$_____ d. $3/4 =$_____

3. Using two Orange rods as the unit, find the value of the following strips.

a. Y = _____ b. P = _____ c. R = _____

4. Complete the following statements with a color.

a. W is $1/2$ of _____ b. R is $1/2$ of _____

c. _____ is $1/2$ of N d. _____ is $1/2$ of D

e. Why do these different colors all represent $1/2$?

5. Complete the following equations with a fraction.

a. R = _____ of D b. R = _____ of N

c. R = _____ of Y d. R = _____ of G

e. How can R represent all these different fractions?

Decimals Part 1

Decimals provide a convenient way to represent fractions. We will address decimals next.

1. Using a chip abacus with decimal point marker, represent the following numbers.

   a. 321.04

   b. 3.2104

   c. 32.104

2. Write the expanded form for the numbers from #4.

   a. 321.04 =

   b. 3.2104 =

   c. 32.104 =

3. Write the word names for the numbers illustrated here.

100	10	1	1/10	1/100
●	●●		●●●	●

10	1	1/10	1/100	1/1000
●●●	●●●●	●		●●●

4. Write the decimal numerals to represent the following numbers.

a. Thirty two and thirteen hundredths

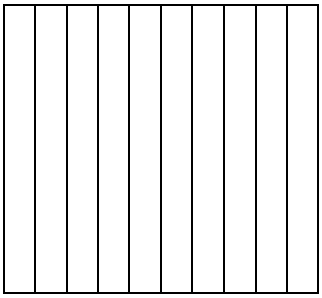
b. Five hundred and twenty-one thousandths

c. $16\frac{694}{10{,}000}$

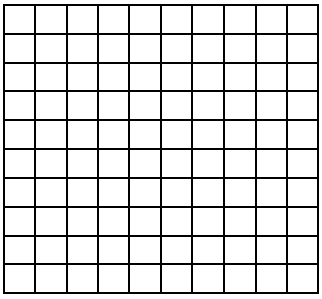
Decimals Part 2

We have used fraction strips to represent fractions as equivalent parts of a whole. Similarly, decimal squares can be used to picture decimals and to illustrate relationships between them.

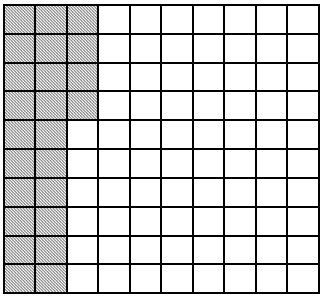
1. a. If a square represents our unit amount, you can divide it into parts in different ways to represent decimal fractions. For example, you can form ten columns. What decimal part does each column represent?

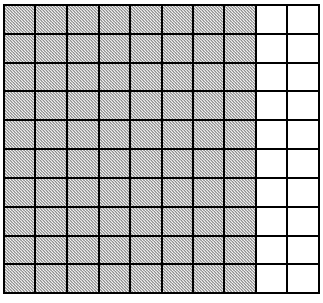


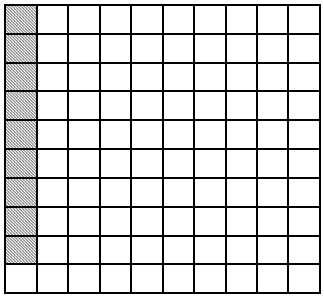
b. If the square is divided into 100 equivalent parts as shown, what decimal part does each small square represent?



2. Write the decimal number represented by the shaded part in each of the following hundreds squares.

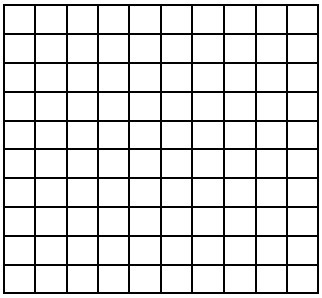
a 

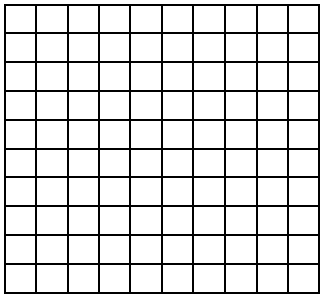
b 

c 

3. Shaded models also help to order decimals (i.e. determine which one is smaller/larger than the other)

a. Which is larger, 0.36 or .40? Explain this in terms of shaded area.





4. Hundreds squares provide a "parts-of-a-whole" way of comparing decimals. Another method involves place value. As an example, consider the decimals 0.709, 0.71, and 0.7.

a. Explain how you can use the concept of place value to order these decimals. Write the numerals in order from smallest to largest.

b. Express the decimals in part (a) so that they all have digits through their thousandths places (this is expressing all of the decimals so that they are all written to the same smallest place value). Arrange these decimals from smallest to largest. Which method for comparing decimals (using shaded area on hundreds squares, using place value, or the method used for this problem) do you think would be most effective in teaching students? Explain.