

**MATH 5: HANDOUT 9**  
**FRACTIONS AND DECIMALS. MORE WORD PROBLEMS**

TODAY'S MATERIAL

**Sets.** *Sets* are collections of similar elements. In mathematics, we usually talk about sets of numbers. The main sets are:

- $\mathbb{N}$ : Set of natural numbers, i.e.  $1, 2, 3, \dots$ ;  
 Operations:  $+, \times$ .
- $\mathbb{Z}$ : Set of integer numbers, i.e.  $\dots, -3, -2, -1, 0, 1, 2, 3, \dots$ ;  
 Operations:  $+, -, \times$ .
- $\mathbb{Q}$ : Set of rational numbers, i.e. numbers that can be written as a fraction  
 Operations:  $+, -, \times, \div$ .

**Fractions and Decimals.** We also talked about how to convert fractions to decimals (see the long division on the right, where we attempt to convert  $\frac{2}{7}$  into a decimal. We keep doing long division until the remainder repeats. Every fraction can be converted to a decimal which will either be finite, or it will be infinite, but there will be a sequence of numbers which constantly repeats itself.

$$\begin{array}{r}
 0.2857142 \\
 7 \overline{) 2.0000000} \\
 \underline{1.4} \phantom{000000} \\
 60 \phantom{00000} \\
 \underline{56} \phantom{00000} \\
 40 \phantom{0000} \\
 \underline{35} \phantom{0000} \\
 50 \phantom{000} \\
 \underline{49} \phantom{000} \\
 10 \phantom{00} \\
 \underline{7} \phantom{00} \\
 30 \phantom{0} \\
 \underline{28} \phantom{0} \\
 20
 \end{array}$$

$$\frac{2}{7} = 0.285714285714 \dots = 0.\overline{285714}.$$

Homework problems on back

## HOMEWORK

1. Open parentheses and collect the like terms:

(a)  $2(2 - b) - 3(2a - b)$

(b)  $a(2 - b) - b(2a - b)$

(c)  $b(2 + b) - a(2a + b)$

2. Convert the following fractions into decimals:

(a)  $\frac{1}{8}$

(b)  $\frac{5}{6}$

(c)  $\frac{1}{7}$

(d)  $\frac{1}{13}$

3. One bookshelf has 70 books and the other one 36. How many books should you move from the first shelf to the second in order to have equal number of books on both?

4. Can you solve the previous problem if the first bookshelf has 70 books, and the second one has 35 books?

5. The car cost \$12,000 more than the motorbike. At the same time, the car is 4 times as expensive as the motorbike. How much do the car and the motorbike cost?

6. If Alice comes to the store with 27 dollars and buys 4 jumping ropes, she will have the same amount of money left as if she comes to the store with 42 dollars and buys 7 jumping ropes. What is the price of the jumping rope?

7. Susan comes to the store to buy oil and vinegar for the salad dressing for a huge party. A bottle of oil is four times as expensive as a bottle of vinegar. If Susan decides to buy 2 bottles of oil and 3 bottles of vinegar, she will have 8 dollars left. If she decides to buy 4 bottles of oil and 2 bottles of vinegar, she will need 6 extra dollars. How much money will she have left, if she just decides to buy 1 bottle of oil and 1 bottle of vinegar?

8. Two secretaries, Barbara and Mary, need to type a 100-page document. Barbara can type it in 4 hours, Mary types slower, so it would take her 5 hours to do this. How fast can they type it together, if they divide the work between the two of them in the most efficient way?

9. Select a circular object of interest. It can be a cylindrical Quaker cereal box, a can, a cylindrical vase, a stump with no visual deviation from the circular shape, etc...

Come up with a way to measure the circumference of the object, and the object diameter in mm. Repeat the measurements 3 times. It is OK to get marginally different measurements.

Fill the attached Laboratory Journal.

Repeat the procedure for 2 or more objects.

Bring your Laboratory Journal to the class.