Applied Math
Basic Calculations I

Course Objectives

1. Demonstrate the understanding of when to use addition, subtraction, multiplication and division.
2. Perform basic math operations with whole numbers.
3. Perform basic math operations with fractions.
4. Perform basic math operations with decimals.
5. Convert between fractions and decimals.
6. Define significant digits.
7. Round decimal numbers to the appropriate number of significant digits.

Key Terms (Define the following)

sum - _____

_____

difference - _____

_____

product - _____

_____

numerator - _____

_____

denominator - _____

_____

significant digits - _____

_____

Principles

Word Clues

And	addition
Sum	addition
Added/Combined	addition
Difference/Change/Excess	subtraction
Remaining	subtraction
Removed/Taken Away	subtraction
Decrease	subtraction
Total	addition or multiplication
Product	multiplication
Each	multiplication
Of	multiplication
In	multiplication or division
Per (/)	division
Is	equal

Rules for Fractions:

1. To add or subtract fractions, they must have the same bottom number (denominator).
2. To add or subtract fractions, add or subtract the top numbers (numerators) only and put the result over the denominator.
3. To add or subtract fractions with different denominators, first convert the fractions to the same denominator.
4. When adding or subtracting mixed numbers (values with whole numbers and fractions), add or subtract the whole numbers together and then the fractions together OR convert to all fractions.
5. Generally, fractional answers should be reduced to mixed fractions and the lowest denominator.
6. To multiply fractions, multiply the numerators and the denominators.
7. When multiplying fractions, values in the denominator can be canceled with 'like' values in the numerator.
8. To divide fractions, invert the divisor (the 2nd fraction) and then multiply the numerators and denominators.

Rules for Decimals:

1. To calculate with fractions and decimals, convert to all fractions or all decimals.
2. To add or subtract numbers with decimals, line up the decimals and then add or subtract.
3. To multiply or divide numbers with decimals, first multiply or divide the digits. Counting from the right, move over one decimal place for each decimal place in the original values.
4. Decimals are rounded to the specified number of digits or to the number of digits in the original values. The desired number of decimal places is called significant digits.
5. Multiplying a number with decimals by 10 moves the decimal 1 place.
6. To divide by a decimal number, change the divisor to a whole number (no decimal) and then divide.

Significant Digit Rules:

1. Non-zero digits are significant (15 has two significant digits; 1.58 has three significant digits).
2. Zeroes placed between other digits are significant (4009 has four significant digits).
3. Zeroes after other digits in a decimal number are significant (7.90 has three significant digits).
4. Zeroes before other digits in a decimal number are not significant (0.046 has two significant digits).
5. Zeroes at the end of a number that are behind a decimal point are significant (70.0 has 3 significant digits; 7.0×10^2 has 2 significant digits). Otherwise it is not possible to know if the zero is significant (70 has either 1 or 2 significant digits).

Questions

1. Suppose a process requires a specific amount of three reactants. With the information given below, what is the total weight going into the process?

   Reactant A = 55 lbs
   Reactant B = 40 lbs
   Reactant C = 105 lbs

2. The reactants from Question 1 produce Product X. If Product X costs $70 for each barrel, how much would 45 barrels cost?

   A barrel holds 35 gallons. How much is Product X per gallon?

3. If a mixture is ½ water, ¼ alcohol, and $^{1}/_{3}$ metal shavings, how much of the mixture is liquid?

4. How much dry product remains if $^{2}/_{5}$ of a 2 lb bag is used?

   Convert to a mixed fraction.

   Convert to a decimal.

5. If a solution is $^{2}/_{3}$ water, how much water is in 3 gal of solution?

How many ¾ gal containers would the 3 gal of solution fill?