

## A FEW MATH HOW TO'S

### I. HOW TO SOLVE A MATH PROBLEM

1. **ORDER OF OPERATIONS-** is the step by step order which must be used to correctly answer all math problems. Think about it, you must put on your socks before you put on your shoes. It is the same with math. The order of the operations in math dictate that you must work on what is inside the grouping symbols first.
2. PEMDAS or GEMDAS are acronyms to remember the order of operations. Please, Excuse, My, Dear, Aunt, Sally.
  - a. P- parentheses or grouping symbols. Perform all operations inside grouping symbols first.
  - b. E- exponents, next work on numbers with exponents.
  - c. M/D – multiplication and division are opposites and at the same level. Therefore you multiple or divide working, LEFT to RIGHT.
  - d. A/S – addition and subtraction are opposites and at the same level. Therefore you add or subtract working LEFT to RIGHT.
  - e.

### II. How To Compare Decimals

1. Line up the digits, use the decimal point as a guide.
2. Compare the digits in the same place from LEFT to RIGHT.
3. If the digits are the same, compare the digits in the next place to the RIGHT.
4. You may add zeros after the last number on right AFTER the decimal point without change the value. EX.  $2.45 = 2.450$ .

### III. How To Add/Subtract Decimals

1. Line up the decimal points. “Line up the Dots”
2. Add the decimal place first. Go from the RIGHT to the LEFT.
3. Add the whole numbers be sure to BRING DOWN the Decimal.

### IV. HOW TO MULTIPLY DECIMALS

1. Ignore the decimals for a little while.
2. Multiply as you would with whole numbers
3. COUNT the decimal places in each factor and ADD that number together.
4. ADD back decimals. Look at your PRODUCT (answer to multiplication) Start from the RIGHT and count moving LEFT. MOVE that number of decimal places.
5. CHECK- does my answer seem make sense.  $3.12 \times 2.02$  THINK a little more than 3 times a little more than 2 should be a little more than 6. 600 would be too big. .06 would be too small.

### V. HOW TO ROUND A NUMBER– Steps to round a number

1. Underline the PLACE VALUE you are to round to.
2. Circle the number to the RIGHT.
3. Decide to **KEEP** or **CHANGE** the UNDERLINED number. If my circled number is 0-4

KEEP. If my circled number is 5-9 CHANGE the underlined number.

4. K/C underlined number; all numbers to the right become zeros.  $6,785 \approx 6,800$

5. FOR DECIMALS- FOLLOW the same procedure. EXCEPT- drop the zero's after the last digit in the decimal number.  $3.782 \approx 3.780 \approx 3.78$

## V. HOW TO ROUND A FRACTION & A MIXED NUMBER

**Fractions-** are rounded to the nearest half.

$1/8 \approx 0$ ,  $3/8 \approx 1/2$ ,  $5/8 \approx 3/4$ ,  $7/8 \approx 1$

**Mixed Numbers** -are rounded to the nearest whole number.  $3 \frac{1}{4} \approx 3$ ,  $35/8 \approx 4$

## VI. HOW TO ESTIMATE FRACTION SUBTRACTION & ADDITION

**Subtraction-** Round BOTH numbers using the rules above and subtract.

**Addition- \*\*\* BE CAREFUL** -You ALWAYS Round Up when adding fractions (and money) to make sure you have enough.  $4 \frac{1}{4} + 3 \frac{1}{2} \approx 5 + 4 = 9$

## VII. HOW TO SOLVE A WORD PROBLEM

1. Read the problem TWICE, the first time to get a general idea of what is being asked.
2. Read the problem again, **CROSS OUT** unnecessary information. **UNDERLINE** important information. **CIRCLE** the question being asked.
3. PLAN & ASK. What do I know? What do I need to know (find)? How do I get there?
4. Organize your information with the tools you have learned in class; Equation, Chart, Graphic Organizer.
5. Solve- Make sure you answer the question being asked! How many altogether can be confused with how many left if you are not careful.
6. **LOOK BACK- this is your most important step.** Does my answer make sense. If the decimal is in the wrong place your answer could be too big or too small. How many left cannot be more than you start with, etc.

## VIII. HOW TO ADD & SUBTRACT FRACTIONS

1. Rewrite fractions vertically.
2. Must have a common denominator to add and subtract fraction. If you have unlike denominators:
  - a. Find the LCM of denominators
  - b. Make the LCM the least common denominator to use for writing equivalent fractions.
  - c. Write equivalent fractions with common denominator.
3. When adding and subtracting fractions, add or subtract numerators (top) and place that answer over (on top of fraction bar).

## IX. HOW TO ADD & SUBTRACT MIXED NUMBERS

1. Write the problem vertically, (up & down).
2. Work on the **FRACTIONAL** part first and then the whole numbers. Follow the procedure above. Fractions must have like (same) denominators.
3. In subtraction if the fractional part is too small you will have to **RENAME**, also known as, borrowing or regrouping. Remember to **PULL** out a **ONE** in its fraction parts, ex  $2/2$ ,  $4/4$ ,  $9/9$ , etc.
4. Simplify and place in **LOWEST** terms.

## **X. HOW TO MULTIPLY FRACTIONS**

1. Multiply the numerator by the numerator (top x top), place over (on top)
2. Multiply the denominator by the denominator (bottom x bottom)
3. CANCELING – before multiplying, if possible cancel out.

**XI. HOW TO DIVIDE FRACTIONS (KCF)-** To divide by a fraction, multiply by its reciprocal.

1. **Keep** the Fraction on the Left.
2. **Change** the division symbol to a multiplication symbol.
3. **Flip** the fraction on the Right.

## **XII. HOW TO MULTIPLY & DIVIDE MIXED NUMBERS**

1. Convert the entire MIXED NUMBER into an IMPROPER fraction.
2. Follow the same rules for multiplying and dividing fractions.
3. Cancel out where possible.
4. Place in simplest terms.

## **XIII. RATIOS – Different types YOU DO IT ALL THE SAME WAY**

1. A ratio is a comparison or relationship between two numbers. Specific types of comparisons are defined and given their own names.
  - a. Fraction is a part to whole relationship.
  - b. Equivalent Fractions have the SAME value,  $\frac{1}{2}$  has the same value or meaning as  $\frac{4}{8}$ , four out of eight.
  - c. Proportions are equivalent ratios. Example in a recipe 2 eggs are needed for every box of cake mix, 4 eggs are need for 2 boxes of cake mix. There is a 2:1 ratio of eggs to cake mix.
  - d. Percentage is a ratio where the “whole” or denominator is always a 100. Think, PER CENT, of one hundred.
  - e. Rate is a comparison with different UNITS. Common rates are \$/gallon, \$/lb., miles/hr.
  - f. Unit rate is the amount for 1 Unit. Unit Rates, always have a ONE (1) in the denominator.
2. Use the same rules you would use for fraction to solve all types RATIO problems.

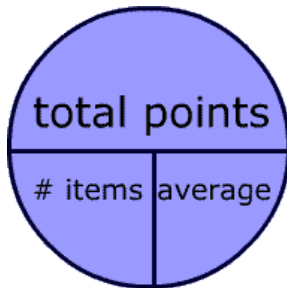
## **XIV. How To Convert Between Different Units (Dimensional Analysis)**

1. Read the problem to identify the original units.
2. Write the original units as a fraction. If it is a whole number, place that number over 1.
3. Decide what you have to change or convert to. Write a CONVERSION EQUATION for the units. 12 inches = 1 foot

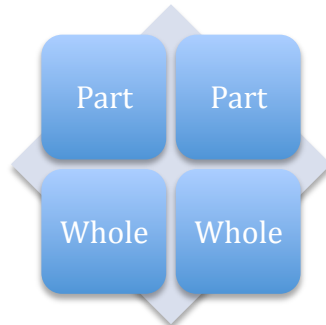
- Rewrite the CONVERSION FACTOR as a fraction or ratio. Remember since the conversion factor is an equal statement writing it as a fraction is a FORM OF ONE (1).  $\frac{12 \text{ inches}}{1 \text{ foot}} = 1$
- Be sure to set up the problem using the conversion fraction that will allow you to divide out or “cancel out” the original units.
- Simplify the expression by dividing out the common factors & common units.

**XV. A FEW HELPFUL GRAPHIC ORGANIZERS**

- MEAN PIE: To find the mean average, divide the sum of the values by the number of values.



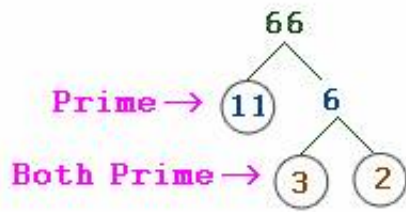
- RATIO/FRACTION BOX:  
SMALL to LARGE



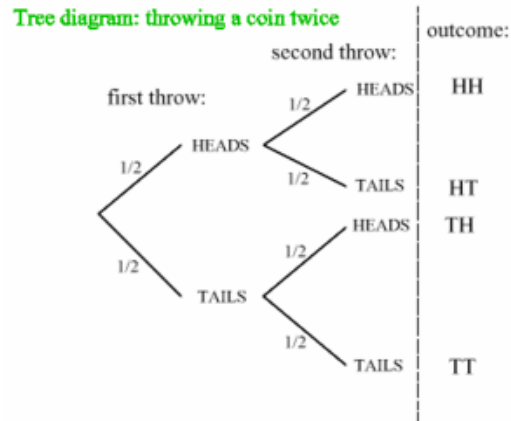
- Charts- There are several different charts you can use to help you organize information; Break up a problem into its parts;

	Rate X	Time =	Distance
Car 1	50 mph	3 hours	150 miles
Car 2	60 mph	4 hours	?

- Factor Tree- a tool to find the prime factors of a number.



5. Tree Diagram



**XV.I A FEW MATH “MANTRAS”**

1. REMEMBER to keep value the same, What ever I do to the top, I do to the bottom, whatever I do to the right, I do to the left.
2. The best way to eat an elephant is one bite at a time. A complex problem can be broken a part into smaller, bite size pieces.
3. In algebraic operations, ISOLATE the variable..
4. When in doubt- read the directions!