CONVERSIONS – CAN YOU CONVERT BETWEEN DIFFERENT SI UNITS?
STRATEGY: USE THE CONVERSION-FACTOR METHOD:
Giga = 10^9
Mega = 10^6
Kilo = 10^3
Centi = 10^{-2}
Milli = 10^{-3}
Micro = 10^{-6}
Nano = 10^{-9}
Pico = 10^{-12}

PRACTICE:

1) 23 m/s = ________ km/h
2) 40 miles/hr = ________ km/s
3) 23 feet = ________ miles  [ 1 foot = 0.3048 m]  [ 1 mile = 1.6 km ]
4) 1 hour = ________ ms (milliseconds)
5) 10 m = ________ nm
REARRANGING EQUATIONS

IN MOST PHYSICS PROBLEMS, YOU WILL HAVE TO REARRANGE THE GIVEN FORMULA IN ORDER TO SOLVE FOR A PARTICULAR VARIABLE. IT IS IMPORTANT THAT YOU MASTER THIS SKILL EARLY ON BECAUSE IT WILL BE USEFUL LATER ON IN THE COURSE.

***Tip: Whenever you have an equation that has a denominator in it (See example 1 below) always cross-multiply. Nobody likes to deal with denominators...they suck!

PRACTICE:

1) \( A = \frac{V_2 - V_1}{T} \), Solve for “\( V_1 \)”

2) \( D = V_1 T + \frac{1}{2} A T^2 \), Solve for “\( A \)”

3) \( A^2 = B^2 + C^2 \) ....Solve for “\( C \)”

4) \( d = \frac{v}{t} - t \) .......Solve for “\( t \)”
1) DISTANCE VERSUS DISPLACEMENT: WHICH IS A SCALAR AND WHICH IS A VECTOR? WHAT DOES THAT MEAN?

Ex. 50 km/h, 6 km [N], 6 centuries, 1.0 kg/week, 400 N [down]

Distance and displacement are different. When you traveled 50 km to the East and then 20 km to the West, the total distance you traveled is 70 km, but your displacement is 30 km East.

***Convention: + is used if object is moving to the right, - for movement to the left.

Examples:

1) A material point moves from A (5 m) to B (-4m). What is the displacement?
2) A material point moves from A (3m) to B (-2m) and finally to C (7m). What is the displacement and what is the total distance covered.
3) A material point moves from X(4m) to Y(-1m) and then to Z (4m). What is the displacement and what is the distance covered?

Example 3 demonstrates an important concept: Even though an object may travel a certain distance, its displacement will be ZERO if the object starts and returns to the SAME location.
THE RELATION BETWEEN FREQUENCY AND PERIOD:

- FREQUENCY AND PERIOD ARE INVERSELY RELATED QUANTITIES. WHAT DOES THAT ACTUALLY MEAN?

\[ F = \frac{1}{T} \]

Period is the time required for one cycle.

\[ T = \frac{\text{time}}{\text{cycles}} \]

FREQUENCY IS SIMPLY THE # OF CYCLES PER SECOND. THE UNIT IS THE HERTZ (Hz).

\[ F = \frac{\text{cycles}}{\text{time}} \]

Example: A recording timer makes 125 dots in 2.5 sec. What is its a) period and b) frequency?

Is there another way to find its frequency?

VECTORS AND VECTORIAL ADDITION:

VECTORS are just a way to represent motion with arrows. That’s it!

Ex. You walk 15km to the East. A vector would look like?:

What about 2-Dimensional motion? How do you get the RESULTANT (displacement) vector?

*** ALWAYS CONNECT VECTORS FROM TIP TO TAIL.

FOR EX.) A car travels 30 km [N] then 40 km [E]. Draw the displacement vector:
Ex. What is the total displacement of a trip in which a person travels 10km [N] and then 24 km [E]?

Let’s see whether you really understand vectors: TRY THIS ONE:

A small boy walks to a candy store 2 blocks [N], 3 blocks [E], 1 block [S], 5 blocks [W], 4 blocks [S], and finally 2 blocks [E]. What is the total displacement? What about the total distance?

If the boy took 15 minutes to complete this trip, then what is his average velocity? What about his average speed?