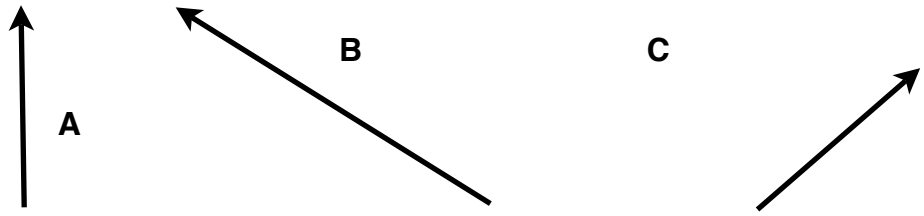
1. Assignment **Due on September 23rd** (distributed September 14th)

1.) Do you remember the mathematical rules?
a) Write in ten notation:
i) 0.00045 ii) 35678000000 iii) 1/4 iv) 0.04672 v) 33330000000
b) Simplify the following expressions:
i) $a^4 * a^3 * 3a^2 =$ ii) $(14(a^2)^5) : (7(a^5)^2) =$ iii) $(a^2)^3bc^4 + (a^3)^2\ 5b\ 7(c^2)^2$
c) Describe the difference between a scalar and a vector and give one example for each kind.

2.) Add and subtract the following vectors graphically!

a) **A + B** b) **B - A** c) **A + C** d) **C - B**



3.) An airplane flies due north at 100 m/s through a 30 m/s cross wind blowing from the east to the west. Determine the resultant velocity of the airplane.

4.) A mountain climbing expedition establishes a base camp and two intermediate camps, A and B. Camp A is 11,200 m east of and 3,200 m above base camp. Camp B is 8,400 m east of and 1,700 m higher than Camp A. Determine the displacement between base camp and Camp B.

5.) Amanda walked backwards with an average speed of 3 m/s She completed her walk in 15 seconds, what was the total distance she traveled in meters?

6.) Aaron ran a race. He ran 400 meters around the race track and finished the race exactly where he started the race. He completed the race in 80 seconds. What was his average velocity?

7.) The position of an object moving in one dimension is measured at certain times. The positions and times are recorded below.

x [m]	0	1	4	10	6	1	-1	-2
t [s]	0	2	4	6	8	10	12	14

(a) Find the average velocities between the measured times. Put your results in a table. Write in the best estimates for the times at which these velocities occur next to your velocity values.

(b) Find the average accelerations for the object. Put your results in the table. Write in the best estimates for the times at which these accelerations occur next to your acceleration values.

(c) Plot x vs. t. Connect the data points with straight line segments.

(d) Plot v_x vs. t. (At what times do you plot your velocity values?) Note that the velocity values are the slopes of the straight line segments on the position graph. Connect the points with straight line segments.

(e) Plot a_x vs. t. (At what times do you plot your acceleration values?) Note that the acceleration values are the slopes of the straight line segments on the velocity graph. Connect the points with straight line segments.

8.) A man standing at the top of a building throws a ball vertically upward with a velocity of 14 m/s. The ball reaches the ground 4.5 s later.

a) What is the maximum height reached by the ball?

b) How high is the building?

c) With what velocity will it reach the ground?