

Assignment 2

1. Draw an equilateral triangle and use it to evaluate $\cos 60^\circ$, $\sin 60^\circ$ and $\tan 60^\circ$.
2. $\vec{x} = (1, 2)$ $\vec{y} = (-1, 4)$
 - a) Evaluate $\vec{x} + 2\vec{y}$.
 - b) Draw the vectors \vec{x} , \vec{y} and $\vec{x} + 2\vec{y}$.
 - c) Find the lengths of vectors \vec{x} and \vec{y} .
3. A spaceship initially at rest as measured by an observer experiences a constant acceleration of $\vec{a} = (1, 2, 3) \text{ m/sec}^2$.
 - a) What is its velocity after 5 seconds?
 - b) What is its speed after 5 seconds?
 - c) What is its position after 5 seconds?
 - d) What is the distance it has traveled in 5 seconds?
4. A pilot points her airplane due north. The speed of the plane in still air is 750 km/hr. There is a wind blowing toward the East of 50 km/hr.
 - a) Draw the two velocity vectors and add them to find the resultant velocity vector of the airplane measured with respect to the ground.
 - b) If the pilot flies 2 hours and is not aware of the wind, how far off course is the plane?
5. A bullet is shot from the ground with an initial speed v_0 at an angle 60° above the horizontal.
 - a) At what time does the bullet start to fall back to the Earth (i.e. the bullet is at its maximum height)?
 - b) What is its maximum height?
 - c) How long does it take before it hits the Earth?
 - d) Where does the bullet hit the Earth?