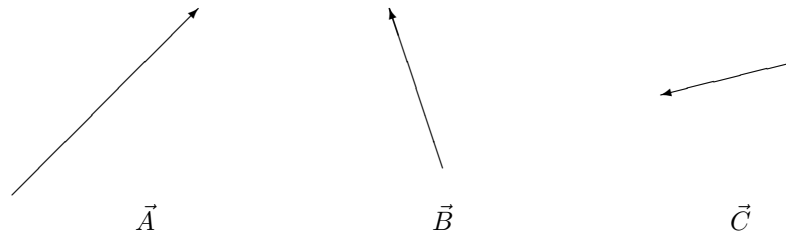**EE112 – Engineering Mathematics II**

Problem Set 3

Due by 5pm on Friday, 23 February 2018

1. Identify each of following physical quantities as either a scalar or a vector:
   (a) the volume of a car's petrol tank; (b) the Earth's magnetic field; (c) the population of Tokyo; (d) the acceleration of a falling object.

2. Let $\vec{A}$, $\vec{B}$ and $\vec{C}$ be the vectors shown below:

$$\vec{A} \qquad\qquad \vec{B} \qquad\qquad \vec{C}$$

   Draw, to the best of your ability, the vectors

   (a) $-0.5\vec{B}$;

   (b) $\vec{A} - \vec{B}$;

   (c) $2\vec{B} - \vec{A} + \vec{C}$.

3. $\vec{x}$ is a vector of magnitude 3 pointing directly southeast and $\vec{y}$ is a vector of magnitude 1 pointing directly west.

   (a) Determine the magnitudes of the vectors $\vec{x} + \vec{y}$ and $\vec{x} - \vec{y}$.

   (b) Determine the directions of $\vec{x} + \vec{y}$ and $\vec{x} - \vec{y}$ relative to east. (As examples of what is meant by this, the given vectors $\vec{x}$ and $\vec{y}$ point, respectively, 45° clockwise from east and 180° anticlockwise from east.)