WORKSHEET 2

1. Let $\underset{\sim}{a} = -2i + 4j - 4k$ and $\underset{\sim}{b} = 5j - 6k$.

   Find $\underset{\sim}{a} - 2\underset{\sim}{b}$

2. Two vectors $\tilde{a}$ and $\tilde{b}$ are defined as $\underset{\sim}{a} = 5i - 3j + 2k$ and $\underset{\sim}{b} = i + 2j - 3k$.

   i) Find $|\underset{\sim}{a}|$

   ii) Find $|\underset{\sim}{b}|$

   iii) Determine the dot product of $\underset{\sim}{a}$ and $\underset{\sim}{b}$.
   $(Use: a.b = a_1b_1 + a_2b_2 + a_3b_3)$

   iv) Hence, calculate the **angle** between $\underset{\sim}{a}$ and $\underset{\sim}{b}$.

3. The parametric form of the equation of a line is given as $\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + t \begin{pmatrix} 4 \\ -5 \\ 6 \end{pmatrix}$

   i) Give the coordinates of a point that lies on this line.

   ii) Write down the Parametric equation of the line.

   iii) Write down the Symmetric equation of the line.

4. If A is the point (12, 3, 4) and B is the point (-6, 12, -5), find the coordinates of point P on the line AB given that $\frac{AP}{AB} = \frac{2}{9}$

5. If A and B are the points (3, 0, -2) and (-1, 2, 4) respectively, find the coordinates of the point P given that AP : PB = 3 : -1

6. The Symmetric equation of a line is given as

$$\frac{x-2}{3} = \frac{y+1}{2} = \frac{z+2}{4}$$

Give the directional vector.