

# IB Mathematics HL 12

## Vectors Assignment

1. Consider the points  $P(-3, -1, 2)$  and  $Q(5, 5, 6)$ .

- (a) Find a vector equation for the line,  $L_1$ , which passes through the points P and Q.

[3 marks]

The line  $L_2$  has equation

$$\mathbf{r} = \begin{bmatrix} -4 \\ 0 \\ 4 \end{bmatrix} + s \begin{bmatrix} 5 \\ 2 \\ 0 \end{bmatrix}$$

- (b) Show that  $L_1$  and  $L_2$  intersect at the point  $R(1, 2, 4)$ .

[4 marks]

- (c) Find the acute angle between  $L_1$  and  $L_2$ .

[3 marks]

Let S be a point on  $L_2$  such that  $|\overrightarrow{RP}| = |\overrightarrow{RS}|$ .

- (d) Show that one of the possible positions for S is  $S_1(-4, 0, 4)$  and find the coordinates of the other possible position,  $S_2$ .

[6 marks]

- (e) Find a vector equation of the line which passes through R and bisects  $\widehat{PRS_1}$ .

[4 marks]