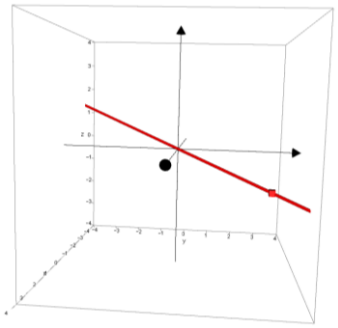
9A Part 1 3D Lines Introduction



1. Find the equation of the straight line that passes through the point A, which has position vector $\begin{pmatrix} 3 \\ -5 \\ 4 \end{pmatrix}$, and is parallel to the vector $\begin{pmatrix} 7 \\ 0 \\ -3 \end{pmatrix}$.

2. Find a vector equation of the straight line that passes through the points A and B, with coordinates $(4,5,-1)$ and $(6,3,2)$ respectively.

3. The straight line l has vector equation:

$$\boldsymbol{r} = (3\boldsymbol{i} + 2\boldsymbol{j} - 5\boldsymbol{k}) + t(\boldsymbol{i} - 6\boldsymbol{j} - 2\boldsymbol{k})$$

Given that the point $(a, b, 0)$ lies on l, find the value of a and the value of b.

4. The straight line l has vector equation:

$$\boldsymbol{r} = (2\boldsymbol{i} + 5\boldsymbol{j} - \mathbf{3}\boldsymbol{k}) + \lambda(6\boldsymbol{i} - 2\boldsymbol{j} + 4\boldsymbol{k})$$

Show that another vector equation of l is:

$$\boldsymbol{r} = (8\boldsymbol{i} + 3\boldsymbol{j} + \boldsymbol{k}) + \mu(3\boldsymbol{i} - \boldsymbol{j} + 2\boldsymbol{k})$$