



1. The position vectors of points A and B are $3i + j - 2k$ and $4i + 5j - 6k$ respectively.
- (a) Find the vector equation of the line that passes through A and B. (4 marks)
- (b) The line through A and B is perpendicular to the vector $8i + nk$. Find the value of n . (3 marks)

Mark scheme:

$$(a) \begin{pmatrix} 4 - 3 \\ 5 - 1 \\ -6 - (-2) \end{pmatrix} = \begin{pmatrix} 1 \\ 4 \\ -4 \end{pmatrix} \quad (M1)(A1)$$

$$r = (3i + j - 2k) + t(i + 4j - 4k) \quad (A1)(A1)$$

or

$$r = (4i + 5j - 6k) + t(i + 4j - 4k)$$

or

The column vector form for each of the equations above.

$$(b) \begin{aligned} (1)(8) + (4)(0) + (-4)(n) & \quad (A1) \text{ for correct dot product} \\ 8 - 4n = 0 & \quad (M1) \text{ setting it equal to zero} \\ n = 2 & \quad (A1) \end{aligned}$$