

1. Find the value of k for which the vectors

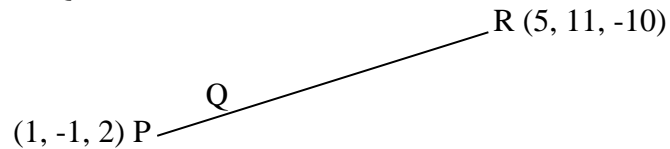
$$\begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix} \text{ and } \begin{pmatrix} -4 \\ 3 \\ k-1 \end{pmatrix} \text{ are perpendicular.}$$

2. Vectors \mathbf{m} and \mathbf{n} intersect at an angle of 45° . If $|\mathbf{m}| = 4$ and $|\mathbf{n}| = 5$ calculate $\mathbf{m} \cdot \mathbf{n}$

3. A, B, and C have coordinates $(1, -3, 4)$, $(-2, 1, 1)$ and $(-11, 13, -8)$.

- Write down the components of \overrightarrow{AB} .
- Hence show that the points A, B and C are collinear.
- Write down the ratio in which B divides AC.

4. The point Q divides \overrightarrow{PR} in the ratio 1:3. Find the coordinates of Q.



5. In triangle FGH, F has coordinates $(2, 3, 1)$, G is $(5, -2, 3)$ and H is $(-1, 0, 3)$. Calculate angle GHF.

