Test - Vectors

Year: Year 11 · Duration: 45 minutes · /20

Name:	Date:	**Mark:** /20

Question	1	2	3	4	5	Total
marks	4	4	4	4	4	**20**
Mark						

Show your working.

Question 1 (4 marks)

Question 1 – Vector arithmetic

$\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$.

a. Work out $2\mathbf{a} - \mathbf{b}$. (2 marks)
b. Work out the magnitude of $\mathbf{a} + \mathbf{b}$, to 2 decimal places. (2 marks)

Question 2 (4 marks)

Question 2 – Journey of a boat

A boat sails from P to Q with km, and then from Q to R with km.

a. Find . (2 marks)

b. Find the distance PR to 1 decimal place. (2 marks)

Question 3 (4 marks)

Question 3 – Parallel vectors

$\mathbf{p} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} 9 \\ k \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} -6 \\ 4 \end{pmatrix}$.

a. Show that $\mathbf{p}$ and $\mathbf{r}$ are parallel. (2 marks)
b. $\mathbf{p}$ and $\mathbf{q}$ are parallel. Find k. (2 marks)

Question 4 (4 marks)

Question 4 – Problem: a vector proof

OAB is a triangle with and . M is the midpoint of OA. N is on AB with $AN : NB = 1 : 3$.

a. Find . (1 mark)

b. Show that . (2 marks)

c. Find . (1 mark)

Question 5 (4 marks)

Question 5 – Problem: a rescue flight

A helicopter flies from a base B to a ship S where km. It then flies on to an oil rig R where km.

a. Find the vector . (1 mark)

b. Work out the total distance flown from B to R via S, to 1 decimal place. (2 marks)

c. The helicopter has fuel for 60 km. Can it return directly from R to B after flying via S? Show your working. (1 mark)