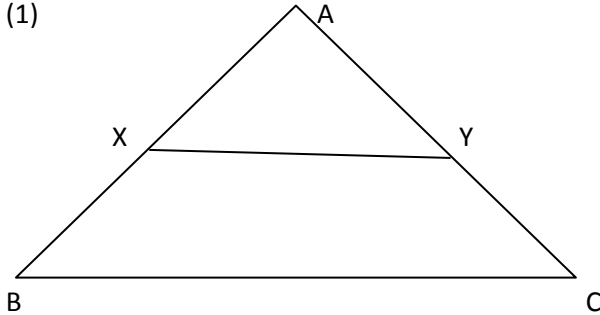


Mathematics

Vectors paper 2

(1)



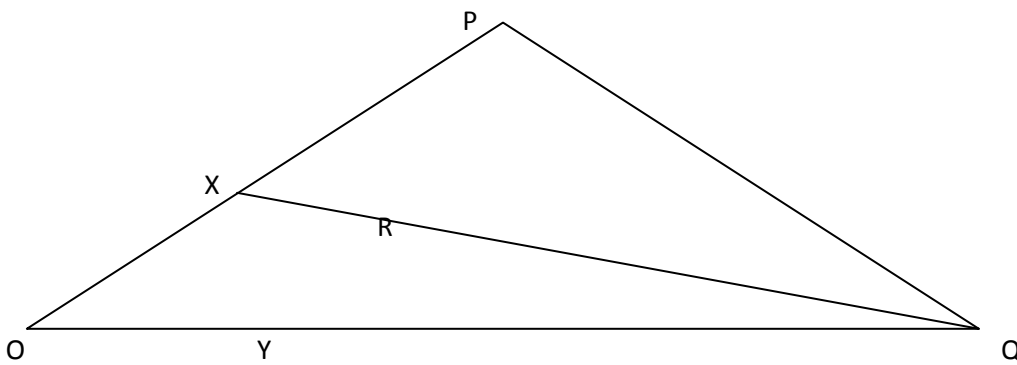
In the figure ABC is a triangle with X and Y as the midpoints of AB and AC. If $AX = x$ and $AY = y$

- (i) Show that BC is parallel to XY
- (ii) Show that $BC = 2XY$
- (iii) Write the ratio of BC:XY

(2) The position vectors of the points A, B, C, and D are $a, b, 3a - b,$ and $a + b$ respectively.

- (a) Prove that CD is parallel AB
- (b) Determine the ratio of AB: CD

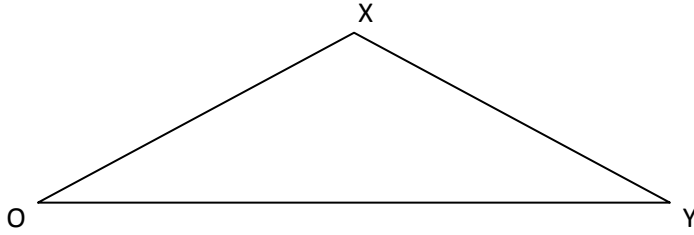
(3)



In the diagram above not drawn to scale, $\overrightarrow{OP} = 12p,$ $\overrightarrow{OQ} = 12q,$ $\overrightarrow{OX} = 4p$ and $\overrightarrow{OY} = 4q$

- (a) State \overrightarrow{PQ} and \overrightarrow{XY} in terms of p and q
- (b) Given that $\overrightarrow{XY} = \frac{1}{4} \overrightarrow{XQ}$ write \overrightarrow{PR} and \overrightarrow{YR} in terms of p and q
- (c) Prove by a vector method that the points Y, R and P are collinear

(4)



In the triangle OXY, $\overrightarrow{OX} = x$ and $\overrightarrow{OY} = y$, M is the midpoint of XY

$$\overrightarrow{OL} = \frac{3}{4}\overrightarrow{OX} \text{ and } \overrightarrow{ON} = \frac{3}{2}\overrightarrow{OY}$$

- (i) Copy the triangle OXY and indicate on the triangle the L, M, N
- (ii) Express in terms of x and y, XY, LM and MN
- (iii) Prove that L, M and N are collinear
- (iv) State the LM:MN