8

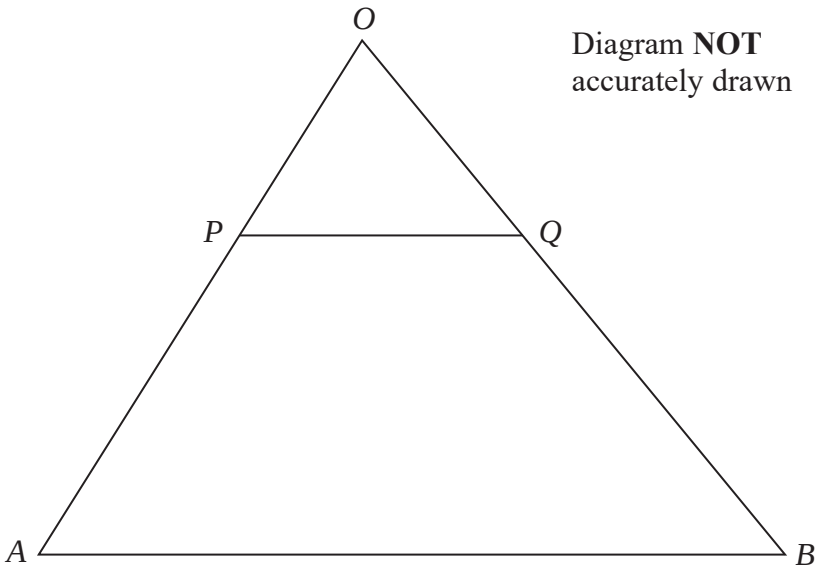

Figure 1

Figure 1 shows triangle OAB in which $\overrightarrow{OA} = 4\mathbf{a}$ and $\overrightarrow{OB} = 8\mathbf{b}$

P is the point on OA such that $OP : OA = 1 : 4$

(a) Express in terms of **a** or **b** or **a** and **b** where appropriate,

(i) $\overrightarrow{AB}$ (ii) $\overrightarrow{PO}$

(2)

Q is the point on OB such that $OQ : OB = 1 : m$ where m is a constant.

$\overrightarrow{PQ} = \alpha \overrightarrow{AB}$ where α is a scalar.

(b) Using vectors, find the value of m and the value of α.

(3)

R is the point on AB such that $AR : AB = 1 : n$ where n is a constant.

(c) Find and simplify an expression for $\overrightarrow{PR}$ in terms of n, **a** and **b**.

(2)

Given that PR is parallel to OB,

(d) find the value of n.

(2)

The area of $APQB$ is $150\ \text{cm}^2$

(e) Calculate the area of triangle OPQ.

(3)

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 12 marks)