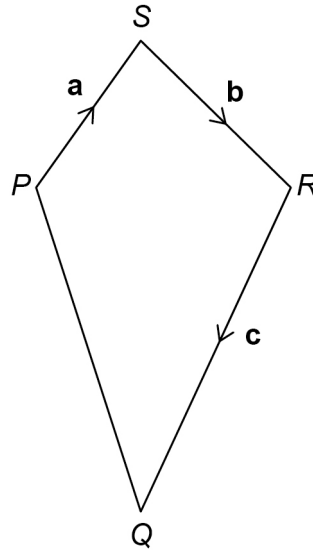


1 Here is quadrilateral  $PQRS$ .

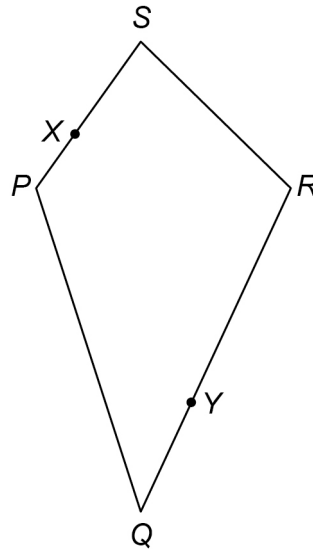
$$\overrightarrow{PS} = \mathbf{a} \quad \overrightarrow{SR} = \mathbf{b} \quad \overrightarrow{RQ} = \mathbf{c}$$



Not drawn  
accurately

X is a point on  $PS$  where  $PX : XS = 1 : 2$

Y is a point on  $RQ$  where  $RY : YQ = 2 : 1$



Not drawn  
accurately

Is  $XY$  parallel to  $PQ$ ?

Show working to support your answer.

**[3 marks]**

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**2**

In the diagram

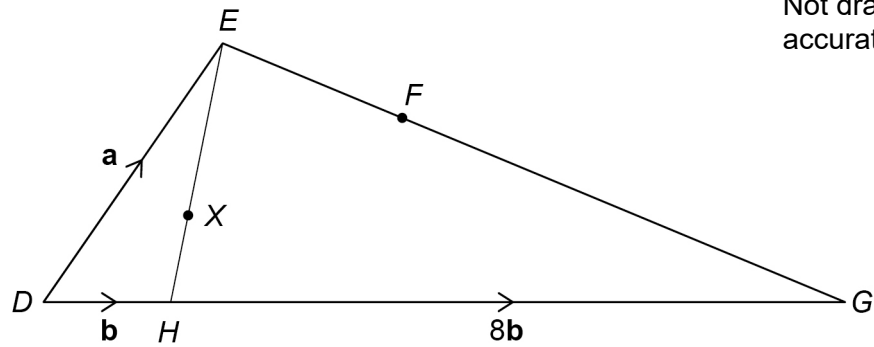
$$\overrightarrow{DE} = \mathbf{a}$$

$$\overrightarrow{DH} = \mathbf{b}$$

$$\overrightarrow{HG} = 8\mathbf{b}$$

$$EX : XH = 3 : 1$$

$$EF : FG = 1 : 3$$

Not drawn  
accurately**2 (a)**Show that  $\overrightarrow{DX} = \frac{1}{4}\mathbf{a} + \frac{3}{4}\mathbf{b}$ **[2 marks]**


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Is  $DXF$  a straight line?

Show working to support your answer.

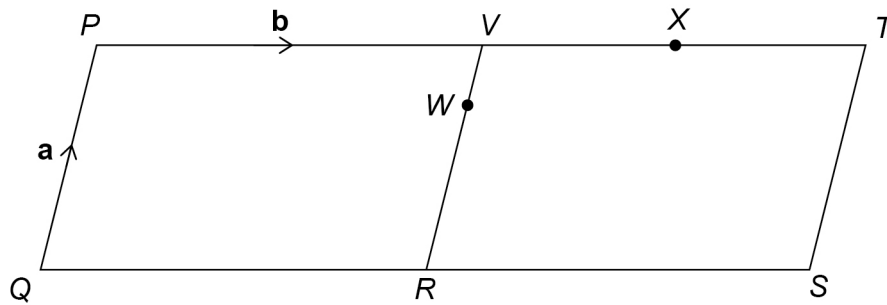
**[4 marks]**

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

3

Two congruent parallelograms,  $PQRV$  and  $VRST$ , are joined.

Not drawn accurately



$$\overrightarrow{QP} = \mathbf{a} \quad \overrightarrow{PV} = \mathbf{b}$$

$X$  is the midpoint of  $VT$ .

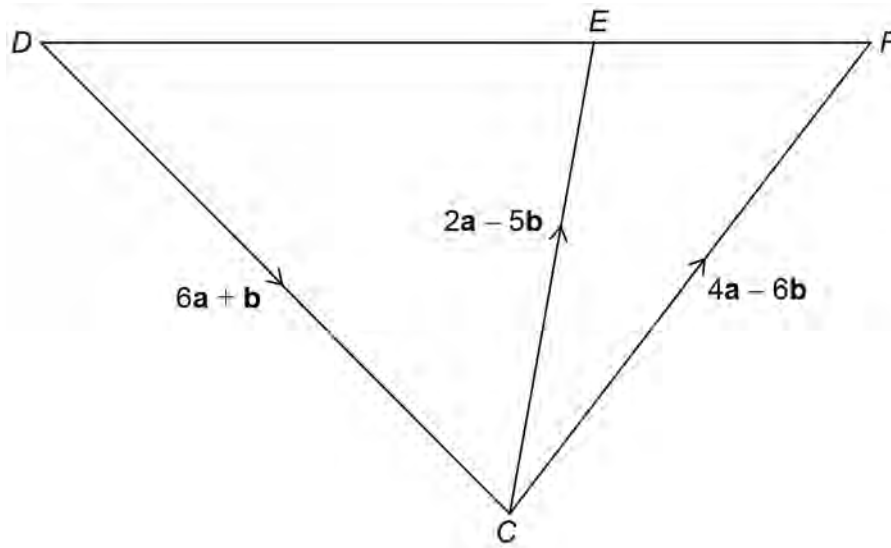
$$VW : WR = 1 : 2$$

Prove that  $Q$ ,  $W$  and  $X$  lie on a straight line.

**[3 marks]**

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Not drawn accurately



**[4 marks]**