

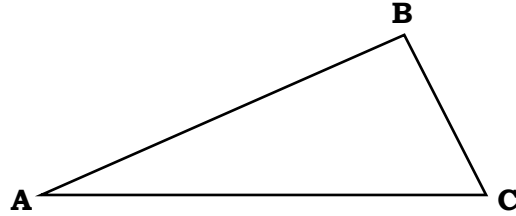
VECTORS – PRACTICE QUESTIONS

1.

ABC is a triangle.

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

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



(a) Label the vectors on the diagram above, using arrows to show the direction.

(b) Find the vector \overrightarrow{AC} in terms of \mathbf{a} and \mathbf{b} .

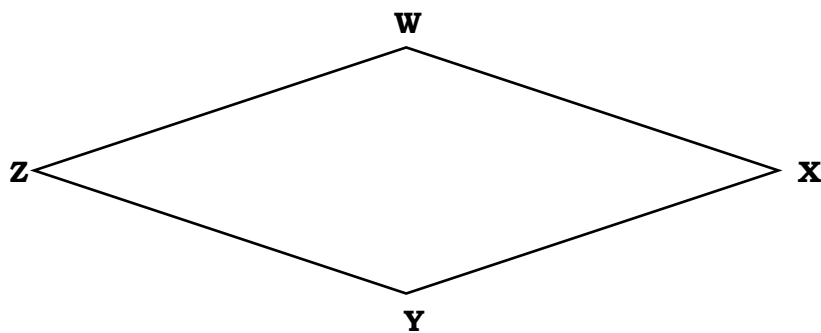
2.

WXYZ is a quadrilateral.

$$\overrightarrow{WX} = \mathbf{c} + \mathbf{d}$$

$$\overrightarrow{XY} = 2\mathbf{c} - \mathbf{d}$$

$$\overrightarrow{ZY} = 2\mathbf{c} + \mathbf{d}$$



(a) Label the vectors on the diagram above, using arrows to show the direction.

(b) Find the vector \overrightarrow{WZ} in terms of \mathbf{c} and \mathbf{d} .

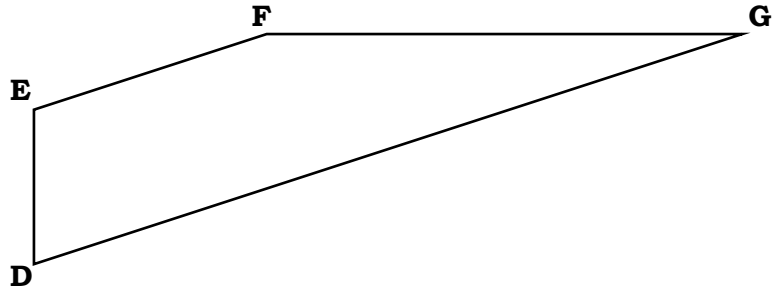
3.

DEFG is a quadrilateral.

$$\overrightarrow{DE} = 2\mathbf{a}$$

$$\overrightarrow{EF} = 3\mathbf{a} - \mathbf{b}$$

$$\overrightarrow{FG} = 4\mathbf{b}$$



(a) Label the vectors on the diagram above, using arrows to show the direction.

(b) Find the vector \overrightarrow{DG} in terms of \mathbf{a} and \mathbf{b} .

(c) X is the midpoint of \overrightarrow{DG} .

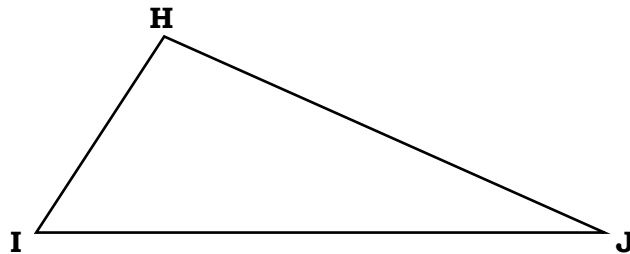
Find the vector \overrightarrow{DX} in terms of \mathbf{a} and \mathbf{b} .

4.

HIJ is a triangle.

$$\overrightarrow{HJ} = 3\mathbf{a} + 2\mathbf{b}$$

$$\overrightarrow{IJ} = 4\mathbf{a} - \mathbf{b}$$



(a) Find the vector \overrightarrow{HI} in terms of \mathbf{a} and \mathbf{b} .

(b) M is the midpoint of \overrightarrow{HI} .

Find the vector \overrightarrow{MJ} in terms of \mathbf{a} and \mathbf{b} .

5.

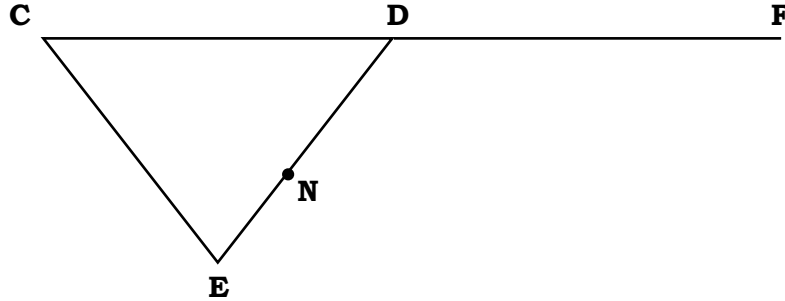
CDE is a triangle.

$$\overrightarrow{EN} = 2\mathbf{c}$$

$$\overrightarrow{ND} = 3\mathbf{c}$$

$$\overrightarrow{CD} = \mathbf{d}$$

D is the midpoint of CF.



(a) Find the vector \overrightarrow{CE} in terms of \mathbf{c} and \mathbf{d} .

(b) Find the vector \overrightarrow{EF} in terms of \mathbf{c} and \mathbf{d} .

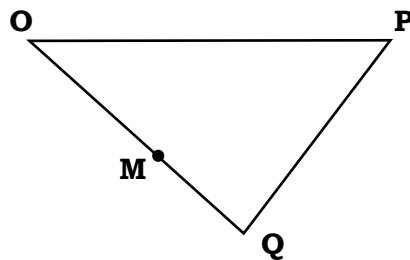
6.

OPQ is a triangle.

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

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

M is the point on OQ such that $OM : MQ = 2 : 1$.



Find the vector \overrightarrow{MQ} in terms of \mathbf{a} and \mathbf{b} .

7.

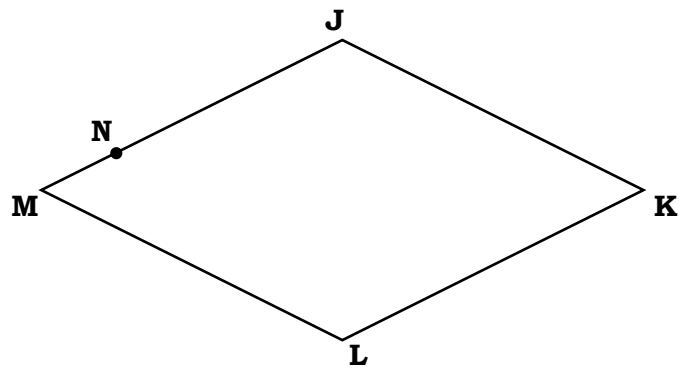
JKLM is a quadrilateral.

$$\overrightarrow{JK} = \mathbf{a} + 3\mathbf{b}$$

$$\overrightarrow{LK} = 2\mathbf{a} - \mathbf{b}$$

$$\overrightarrow{ML} = 4\mathbf{a} + 3\mathbf{b}$$

N is the point on MJ such that $MN : NJ = 1 : 3$.



(a) Find the vector \overrightarrow{MJ} in terms of \mathbf{a} and \mathbf{b} .

(b) Find the vector \overrightarrow{NJ} in terms of \mathbf{a} and \mathbf{b} .

(c) Find the vector \overrightarrow{NL} in terms of \mathbf{a} and \mathbf{b} .

8.

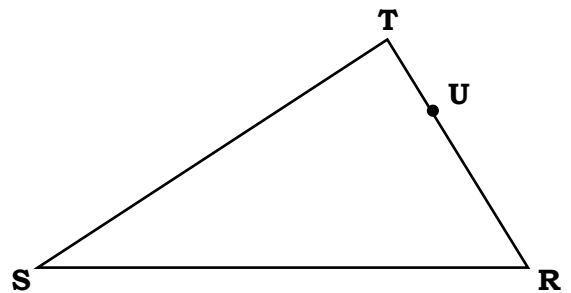
RST is a triangle.

$$\overrightarrow{RS} = 7\mathbf{c} - 4\mathbf{d}$$

$$\overrightarrow{ST} = 5\mathbf{d} - 2\mathbf{c}$$

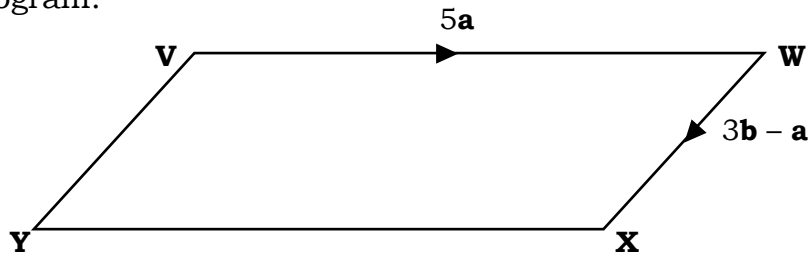
U is the point on TR such that $TU : UR = 2 : 3$.

Find the vector \overrightarrow{RU} in terms of \mathbf{c} and \mathbf{d} .



9.

VWXY is a parallelogram.



M is the point on YX such that $YM : MX = 3 : 4$.

Find the vector \overrightarrow{MW} in terms of \mathbf{a} and \mathbf{b} .

10.

XYZ is a triangle.

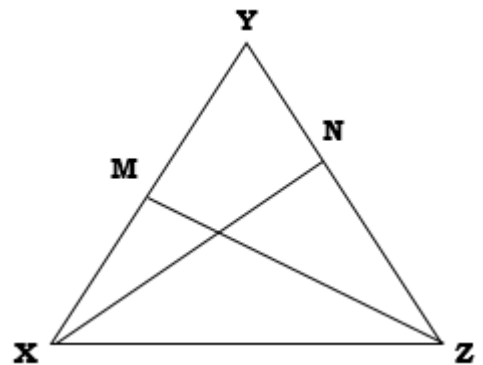
$$\overrightarrow{XY} = \mathbf{a}$$

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

M is the midpoint of XY.

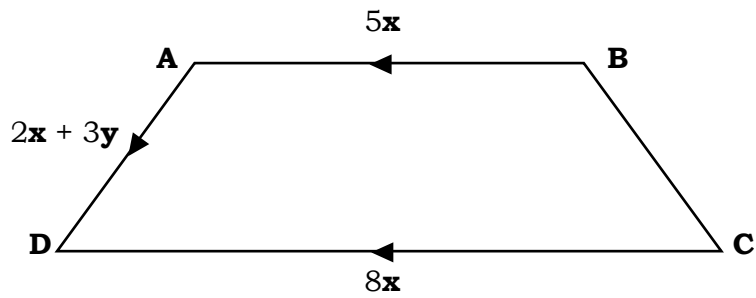
N is the point on YZ such that $YN : NZ = 1 : 2$.

Find the vector \overrightarrow{MN} in terms of \mathbf{a} and \mathbf{b} .



11.

ABCD is a trapezium.



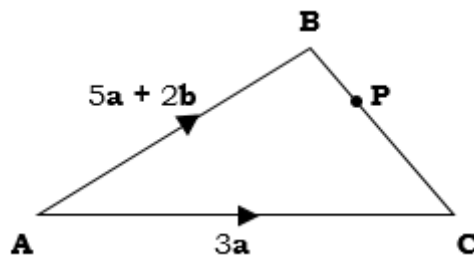
Q is the point on BC such that $BQ : QC = 3 : 2$.

Find the vector \overrightarrow{QC} in terms of \mathbf{x} and \mathbf{y} .

12.

ABC is a triangle.

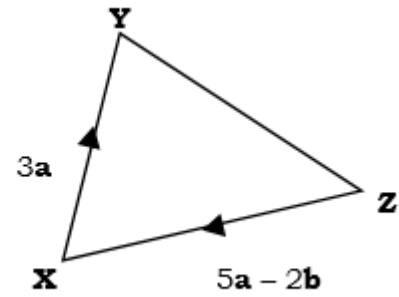
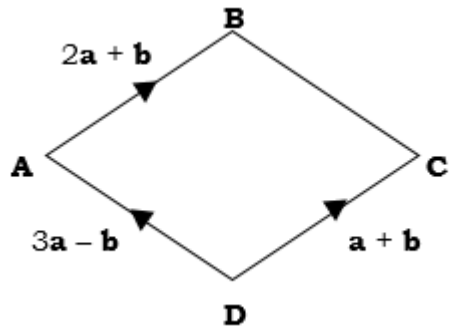
P is the point on BC such that $BP : PC = 1 : 3$.



Show that the vector \overrightarrow{AP} is parallel to the vector $3\mathbf{a} + \mathbf{b}$.

13.

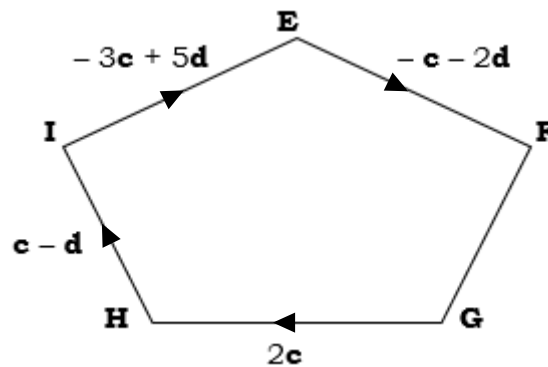
ABCD is a quadrilateral and XYZ is a triangle.



Show that CB and ZY are parallel.

14.

EFGHI is a pentagon.



Show that HE and GF are parallel.

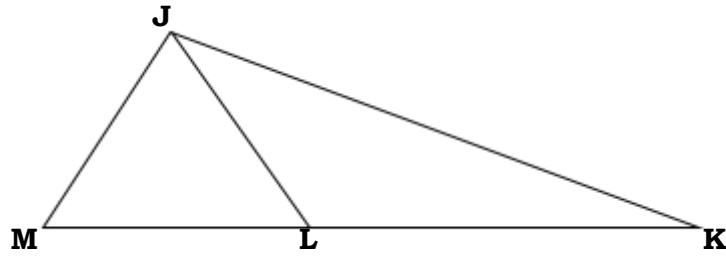
15.

JKM is a polygon.

$$\overrightarrow{MJ} = \mathbf{e} + \mathbf{f}$$

$$\overrightarrow{JK} = 5\mathbf{e} - 4\mathbf{f}$$

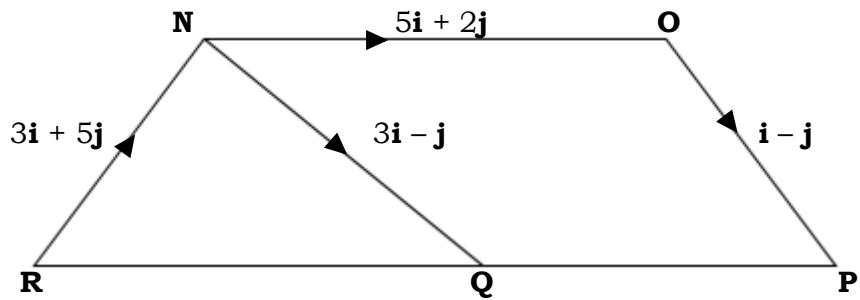
$$\overrightarrow{LJ} = 2\mathbf{f} - \mathbf{e}$$



Show that MLK is a straight line.

16.

NOPR is a polygon.

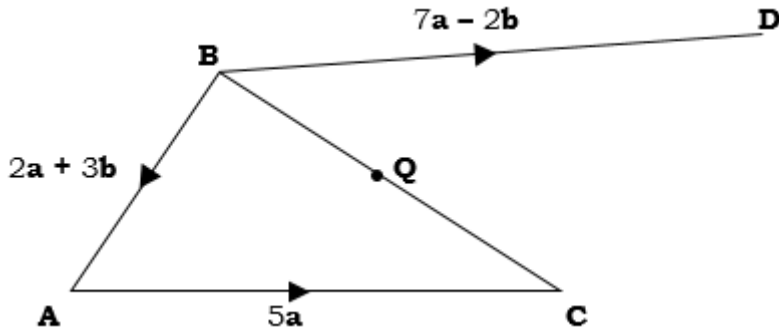


Is RQP a straight line? Explain your answer.

17.

ABC is a triangle, and BD is a straight line.

Q is the midpoint of the line BC.



Is AQD a straight line? Explain your answer.

18.

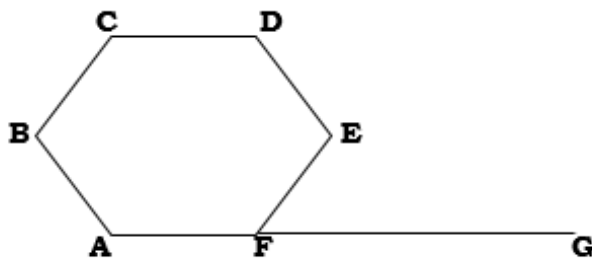
ABCDEF is a regular hexagon.

$$\overrightarrow{FG} = 3\overrightarrow{AF}$$

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

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

$$\overrightarrow{EF} = \mathbf{a} - \mathbf{b}$$



Show that CEG is a straight line.

19.

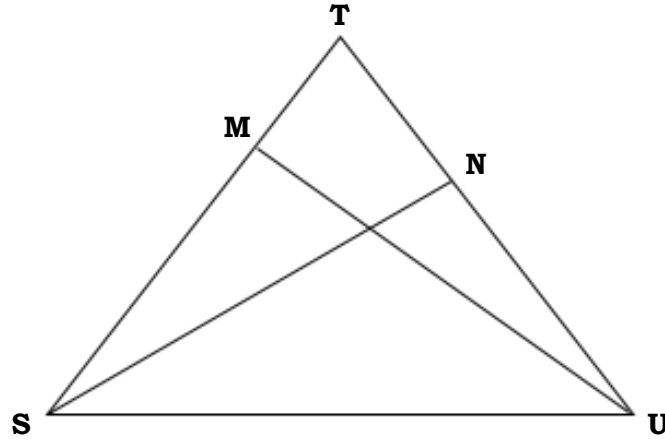
STU is a triangle.

$$\overrightarrow{ST} = 3\mathbf{x} + \mathbf{y}$$

$$\overrightarrow{SU} = 4\mathbf{x}$$

M is the point on ST such that $SM : MT = 2 : 1$.

N is the point on TU such that $TN : NU = 3 : 4$.

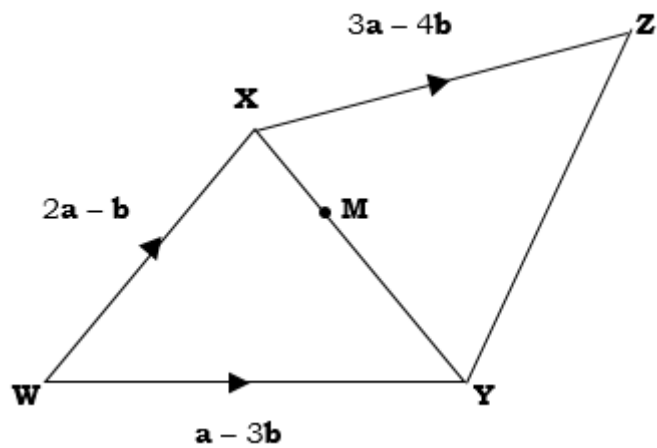


Find the vector \overrightarrow{MN} in terms of \mathbf{x} and \mathbf{y} .

20.

WXY and XYZ are triangles.

M is the point on XY such that $XM : MY = 1 : 2$.

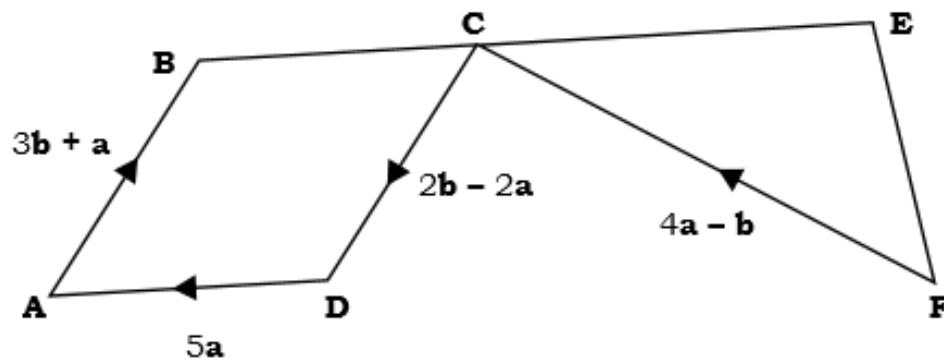


Show that WMZ is a straight line.

21.

ABCD is a quadrilateral and CEF is a triangle.

BE is a straight line with $BC : CE = 3 : 5$.



Find the vector \overrightarrow{EF} in terms of \mathbf{a} and \mathbf{b} .