

Question 1

$ABCD$ is a trapezium. M is the midpoint of BC .

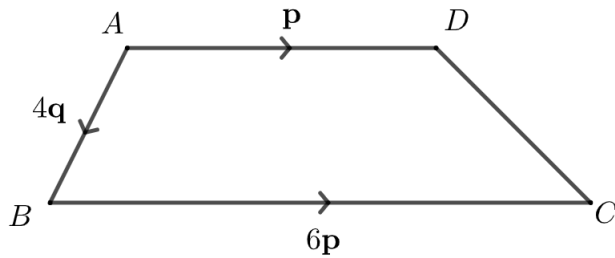


Diagram not drawn accurately

X is the point such that DMX is a straight line and $DM : MX$ is $1 : k$.

Given that $\overrightarrow{BX} = 7\mathbf{p} + 8\mathbf{q}$, find the value of k .

Question 2

$$h(x) = 3x - 7$$

k is the number such that $h(k) = 9k$

Find the value of k .

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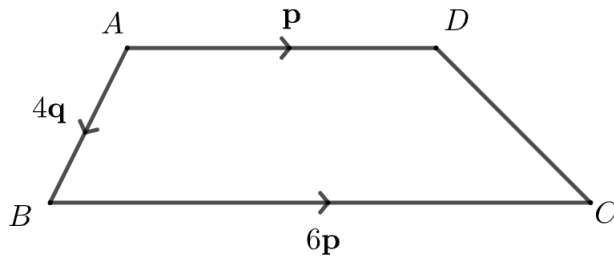


Diagram not drawn accurately

X is the point such that DMX is a straight line and $DM : MX$ is $1 : k$.

Given that $\overrightarrow{BX} = 7\mathbf{p} + 8\mathbf{q}$, find the value of k .

$$\overrightarrow{DM} = -\mathbf{p} + 4\mathbf{q} + 3\mathbf{p} = 2\mathbf{p} + 4\mathbf{q}$$

$$\overrightarrow{MX} = k(2\mathbf{p} + 4\mathbf{q}) \text{ using the given ratio.}$$

$$\overrightarrow{BX} = \overrightarrow{BM} + \overrightarrow{MX} = 3\mathbf{p} + k(2\mathbf{p} + 4\mathbf{q})$$

Equating this with the given information about \overrightarrow{BX} , we see $k = 2$

Question 2

$$h(x) = 3x - 7$$

k is the number such that $h(k) = 9k$

Find the value of k .

We need to solve:

$$3k - 7 = 9k$$

$$\Rightarrow -7 = 6k$$

$$\Rightarrow k = -\frac{7}{6}$$