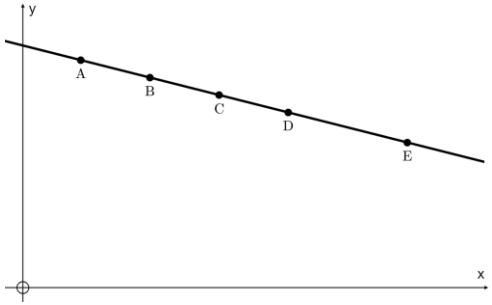
a)

A, B, C, D and E are points on a straight line.



A, B, C and D are equally spaced.

AD : DE = 2 : 1.

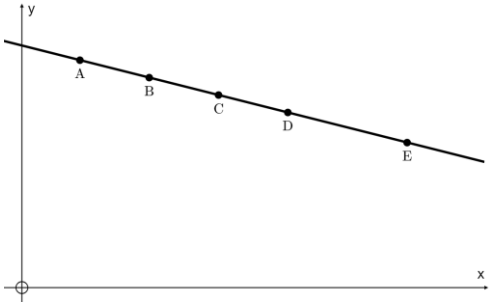
A is the point (5, 26) and B is the point (11, 22).

Work out the coordinates of the point E.

What is the vector $\overrightarrow{AD}$?	$\overrightarrow{AD} = 3\overrightarrow{AB}$ $\overrightarrow{AB} = \begin{pmatrix} 11-5 \\ 22-26 \end{pmatrix} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ $\overrightarrow{AD} = 3\overrightarrow{AB} = 3 \times \begin{pmatrix} 6 \\ -4 \end{pmatrix} = \begin{pmatrix} 18 \\ -12 \end{pmatrix}$
What is the vector $\overrightarrow{DE}$?	AD : DE = 2 : 1 $\overrightarrow{DE} = \frac{1}{2}\overrightarrow{AD} = \frac{1}{2} \times \begin{pmatrix} 18 \\ -12 \end{pmatrix} = \begin{pmatrix} 9 \\ -6 \end{pmatrix}$
What are the coordinates of D?	$D = A + \overrightarrow{AD} = (5, 26) + \begin{pmatrix} 18 \\ -12 \end{pmatrix} = (23, 14)$
What are the coordinates of E?	$E = D + \overrightarrow{DE} = (23, 14) + \begin{pmatrix} 9 \\ -6 \end{pmatrix} = (32, 8)$

b)

A, B, C, D and E are points on a straight line.



A, B, C and D are equally spaced.

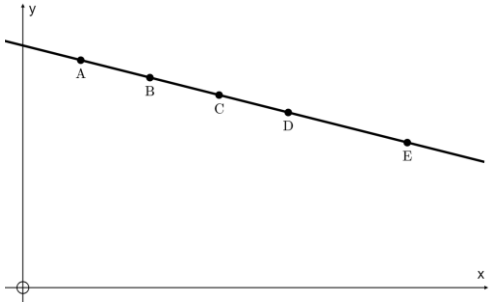
AD : DE = 3 : 2.

A is the point (4, 35) and B is the point (9, 29).

Work out the coordinates of the point E.

What is the vector $\overrightarrow{AD}$?	$\overrightarrow{AD} = 3\overrightarrow{AB}$ $\overrightarrow{AB} = \begin{pmatrix} 9-4 \\ 29-35 \end{pmatrix} = \begin{pmatrix} 5 \\ -6 \end{pmatrix}$ $\overrightarrow{AD} = 3\overrightarrow{AB} = 3 \times \begin{pmatrix} 5 \\ -6 \end{pmatrix} = \begin{pmatrix} 15 \\ -18 \end{pmatrix}$
What is the vector $\overrightarrow{DE}$?	AD : DE = 3 : 2 $\overrightarrow{DE} = \frac{2}{3}\overrightarrow{AD} = \frac{2}{3} \times \begin{pmatrix} 15 \\ -18 \end{pmatrix} = \begin{pmatrix} 10 \\ -12 \end{pmatrix}$
What are the coordinates of D?	
What are the coordinates of E?	

c)
A, B, C, D and E are points on a straight line.

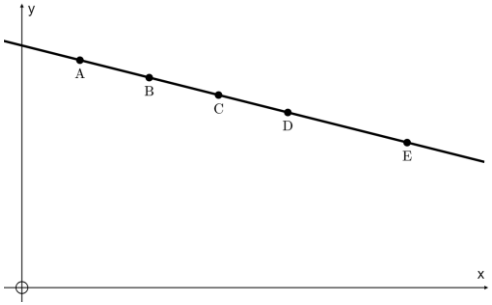


A, B, C and D are equally spaced.
AC : CE = 3 : 4.
A is the point (5, 40) and B is the point (8, 34).

Work out the coordinates of the point E.

What is the vector $\overrightarrow{AC}$?	$\overrightarrow{AC} = 2\overrightarrow{AB}$ $\overrightarrow{AB} = \begin{pmatrix} 8-5 \\ 34-40 \end{pmatrix} = \begin{pmatrix} 3 \\ -6 \end{pmatrix}$ $\overrightarrow{AC} = 2\overrightarrow{AB} = 2 \times \begin{pmatrix} 3 \\ -6 \end{pmatrix} = \begin{pmatrix} 6 \\ -12 \end{pmatrix}$
What is the vector $\overrightarrow{CE}$?	
What are the coordinates of C?	
What are the coordinates of E?	

d)
A, B, C, D and E are points on a straight line.



A, B, C and D are equally spaced.
AD : DE = 3 : 2.
A is the point (4, 45) and B is the point (8, 40).

Work out the coordinates of the point E.