

16th August



Corbettmaths

By using completing the square, find the coordinates of the minimum point on the curve

$$y = x^2 + x - 5$$

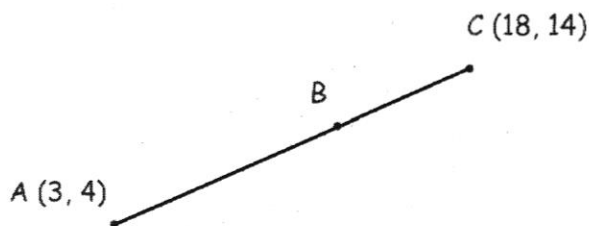
$$= \left(x + \frac{1}{2}\right)^2 - \frac{1}{4} - 5 = \left(x + \frac{1}{2}\right)^2 - \frac{21}{4}$$

Min pt $\left(-\frac{1}{2}, -\frac{21}{4}\right)$.

Find where the matrix $\begin{pmatrix} 6 & -1 \\ 0 & 5 \end{pmatrix}$ maps the point $(4, -1)$

$$\begin{pmatrix} 6 & -1 \\ 0 & 5 \end{pmatrix} \begin{pmatrix} 4 \\ -1 \end{pmatrix} = \begin{pmatrix} 25 \\ -5 \end{pmatrix}$$

$$(4, -1) \rightarrow (25, -5)$$



ABC is a straight line.
AB : BC = 13 : 7

Work out the coordinates of the point B

$$\vec{AC} = \begin{pmatrix} 15 \\ 10 \end{pmatrix} \quad \vec{AB} = \frac{13}{20} \vec{AC}$$

$$\vec{OB} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} + \frac{13}{20} \begin{pmatrix} 15 \\ 10 \end{pmatrix} = \begin{pmatrix} \frac{51}{4} \\ \frac{21}{2} \end{pmatrix}$$

$$B \left(12\frac{3}{4}, 10\frac{1}{2}\right)$$

A curve has equation
 $y = 4x^3 - 10x^2 - 8x + 3$

Find the coordinates of the minimum point.

$$\frac{dy}{dx} = 12x^2 - 20x - 8$$

$$SP \Rightarrow 12x^2 - 20x - 8 = 0$$

$$\Rightarrow 3x^2 - 5x - 2 = 0$$

$$\Rightarrow (3x + 1)(x - 2) = 0$$

$$\Rightarrow x = -\frac{1}{3}, 2$$

$$\frac{d^2y}{dx^2} = 24x - 20$$

$$x = 2 \Rightarrow \frac{d^2y}{dx^2} = 28 > 0 \Rightarrow \text{MIN}$$

$$\text{at } (2, -21)$$