

**17th October**

Corbettmaths

The first two term terms in a linear sequence are  $10 - 2\sqrt{3}$  and  $\sqrt{3}$

What is the fourth term in the sequence?

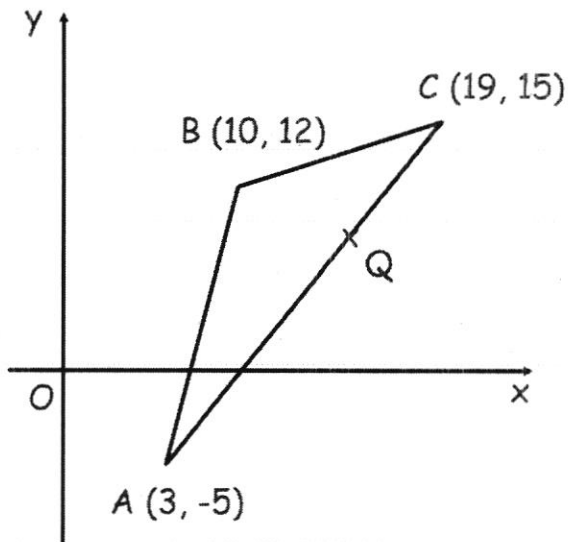
$$d = \sqrt{3} - (10 - 2\sqrt{3})$$

$$= 3\sqrt{3} - 10$$

$$t_4 = t_2 + 2d$$

$$= \sqrt{3} + 2(3\sqrt{3} - 10)$$

$$= \underline{7\sqrt{3} - 20}$$



Q is a point on AC such that  $AQ:QC = 1:3$

Work out the length of BQ.

$$\vec{AC} = \begin{pmatrix} 16 \\ 20 \end{pmatrix}$$

$$\vec{AQ} = \frac{1}{4} \vec{AC} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$$

$$\vec{OQ} = \begin{pmatrix} 3 \\ -5 \end{pmatrix} + \begin{pmatrix} 4 \\ 5 \end{pmatrix} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$$

$$Q(7, 0)$$

$$BQ = \sqrt{3^2 + 12^2}$$

$$= \sqrt{153}$$

$$= \underline{3\sqrt{17}} \quad (12.37)$$

A curve has equation  $y = 2x^2 + x - 11$

At point Q on the curve, the tangent is parallel to the line  $y = 5x - 1$

Work out the coordinates of Q.

$$\frac{dy}{dx} = 4x + 1$$

$$\text{At } Q \quad 4x + 1 = 5$$

$$\Rightarrow x = 1$$

$$\Rightarrow \underline{Q(1, -8)}$$

Use Pascal's triangle to expand

$$(x + y)^5$$

$$\begin{array}{cccccc} 1 & 5 & 10 & 10 & 5 & 1 \\ x^5 & x^4 & x^3 & x^2 & x & 1 \\ 1 & y & y^2 & y^3 & y^4 & y^5 \\ x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 & & & & & \\ & & & & + 5xy^4 + y^5 & \end{array}$$