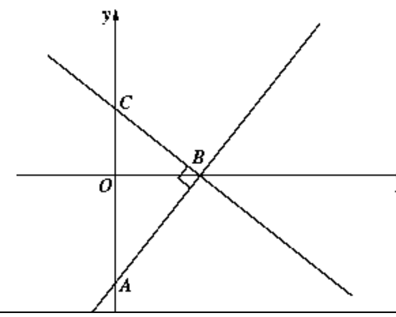
Want more revision exercises? Get **MathsFit** - *New from projectmaths.*

09 **5a**

In the diagram, the points A and C lie on the y-axis and the point B lies on the x-axis. The line AB has equation $y = \sqrt{3}\,x - 3$.
The line BC is perpendicular to AB.

(i) Find the equation of the line BC. **2**

(ii) Find the area of the triangle ABC. **2**



(i) To find co-ords of B,

$$\text{subs } y = 0 \text{ in } y = \sqrt{3}\,x - 3$$
$$0 = \sqrt{3}\,x - 3$$
$$\sqrt{3}\,x = 3$$
$$x = \frac{3}{\sqrt{3}}$$
$$= \sqrt{3}$$

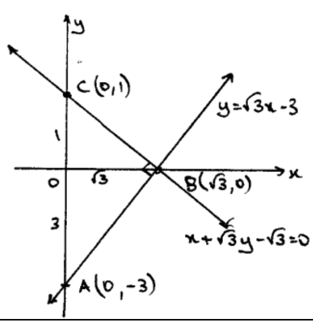
$\therefore B(\sqrt{3}, 0)$

Also as grad of $AB = \sqrt{3}$ and $BC \perp AB$,

then grad of $BC = -\frac{1}{\sqrt{3}}$.

Eqn BC: using $y - y_1 = m(x - x_1)$

$$y - 0 = -\frac{1}{\sqrt{3}}(x - \sqrt{3})$$
$$\sqrt{3}\,y = -x + \sqrt{3}$$
$$x + \sqrt{3}\,y - \sqrt{3} = 0$$



(ii) To find co-ords of C,

$$\text{subs } x = 0 \text{ in } x + \sqrt{3}\,y - \sqrt{3} = 0$$
$$\sqrt{3}\,y = \sqrt{3}$$
$$y = 1$$

$\therefore C(0, 1)$

To find co-ords of A,

$$\text{subs } x = 0 \text{ in } y = \sqrt{3}\,x - 3$$
$$y = -3$$

$\therefore A(0, -3)$

State Mean: **1.43/2** **1.10/2**

$$\therefore \text{Area} = \frac{1}{2} \times AC \times OB$$
$$= \frac{1}{2} \times 4 \times \sqrt{3}$$
$$= 2\sqrt{3}$$

$\therefore$ area is $2\sqrt{3}$ units^2

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

(i) Most candidates used the formula $m_1 m_2 = -1$ to get the gradient of the normal and then used the point-gradient formula $y - y_1 = m(x - x_1)$ to obtain the equation of BC.
A significant number of candidates made a simple calculation error. Candidates who showed correct working were rewarded with one mark.

(ii) Students who used the axes as the base and height of the triangle were more successful than those who attempted to use AB and BC.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/