

The point A has coordinates $(a, 3)$ and the point B has coordinates $(7, b)$. The line AB has equation $2x + 3y = 11$.

- a) Find the values of a and b

The line AC is perpendicular to the line AB.

- b) Find the equation of the line AC in the form $ax + by + d = 0$, where a, b and d are constants
c) Given that C lies on the x axis, find its coordinates.

- a) The y coordinate of $A(a, 3)$ is 3

$$2x + 3y = 11$$

$$2a + 3(3) = 11$$

$$2a = 2$$

$$a = 1$$

The x coordinate of $B(7, b)$ is 7

$$2x + 3y = 11$$

$$2(7) + 3b = 11$$

$$3b = -3$$

$$b = -1$$

- b)

$$3y = -2x + 11$$

$$y = -\frac{2}{3}x + \frac{11}{3}$$

Gradient of line AB = $-\frac{2}{3}$

Gradient of line AC = $\frac{3}{2}$

Line AC has gradient = $\frac{3}{2}$ and passes through the point $A(1,3)$

Equation of AC $y - 3 = \frac{3}{2}(x - 1)$

$$2(y - 3) = 3(x - 1)$$

$$2y - 6 = 3x - 3$$

$$3x - 2y + 3 = 0$$

c) Given that C lies on the x axis,
 $y = 0$

$$3x - 2y + 3 = 0$$

$$3x - 2(0) + 3 = 0$$

$$3x = -3$$

$$x = -1$$

$$C(-1,0)$$

