

1. The line l_1 has equation $2x + 4y - 3 = 0$

The line l_2 has equation $y = mx + 7$, where m is a constant.

Given that l_1 and l_2 are perpendicular,

(a) find the value of m .

(2)

The lines l_1 and l_2 meet at the point P .

(b) Find the x coordinate of P .

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(2)

$$\begin{aligned} \text{(a)} \quad l_1 \quad 2x + 4y - 3 &= 0 \\ 4y &= 3 - 2x \\ y &= -\frac{1}{2}x + \frac{3}{4} \quad \text{--- (1)} \end{aligned}$$

So gradient of l_1 is $-\frac{1}{2}$
 l_2 is \perp to l_1 so gradient = $-\left(\frac{1}{\text{grad } l_1}\right)$
 $= 2$.

l_2 can be written

$$y = 2x + 7 \quad \text{--- (2)}$$

Equating y in (1) and (2)

$$-\frac{1}{2}x + \frac{3}{4} = 2x + 7$$

$$\frac{3}{4} - 7 = \frac{5x}{2}$$

$$-\frac{25}{4} = \frac{5x}{2}$$

$$\underline{x = -5/2}$$