# Sample Paper 4: Paper 2

## Question 1 (25 marks)

### Question 1 (a)

$x + y - 3 = 0 \Rightarrow m_1 = -1$

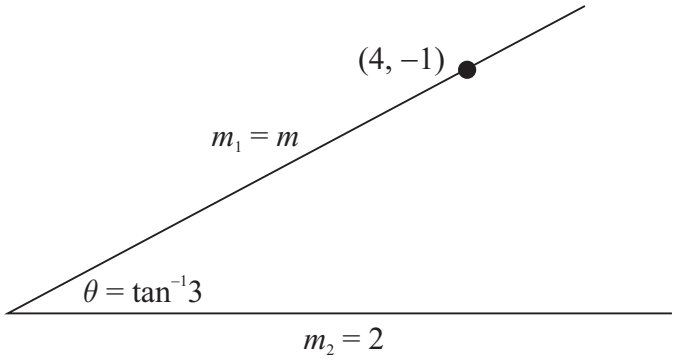
$2x + y - 1 = 0 \Rightarrow m_2 = -2$

$$\tan\theta = +\left(\frac{-1-(-2)}{1+(-1)(-2)}\right) = \left(\frac{-1+2}{1+2}\right) = \frac{1}{3}$$

$$\boxed{\tan\theta = \pm\left(\frac{m_1 - m_2}{1 + m_1 m_2}\right)}$$

$\therefore \theta = \tan^{-1}(\frac{1}{3}) = 18.4^{\circ}$

### Question 1 (b)




$\theta = \tan^{-1} 3 \Rightarrow \tan\theta = 3$

$2x - y - 8 = 0 \Rightarrow m_2 = 2$

$$3 = \pm\left(\frac{m-2}{1+2m}\right)$$

| | |
|---|---|
| $\therefore 3(1+2m) = (m-2)$ | $\therefore 3(1+2m) = -(m-2)$ |
| $3 + 6m = m - 2$ | $3 + 6m = -m + 2$ |
| $5m = -5$ | $7m = -1$ |
| $m = -1$ | $m = -\frac{1}{7}$ |

Equations of line:

$l_1 : m = -1 \Rightarrow x + y + k = 0$

$(4, -1) \in l_1 \Rightarrow 4 - 1 + k = 0 \Rightarrow k = -3$

$l_1 : x + y - 3 = 0$

$l_2 : m = -\frac{1}{7} \Rightarrow x + 7y + k = 0$

$(4, -1) \in l_2 \Rightarrow 4 - 7 + k = 0 \Rightarrow k = 3$

$l_2 : x + 7y + 3 = 0$