

SAMPLE PAPER 6: PAPER 2

QUESTION 1 (25 MARKS)

Question 1 (a)

$(x, 0)$ is a point on the x -axis.

Distance d_1 of $(x, 0)$ to line k : $d_1 = \frac{|3x - 4(0) + 5|}{\sqrt{3^2 + 4^2}} = \frac{|3x + 5|}{5}$

$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

Distance d_2 of $(x, 0)$ to line l : $d_2 = \frac{|5x - 12(0) - 1|}{\sqrt{5^2 + 12^2}} = \frac{|5x - 1|}{13}$

$$d_1 = d_2 \Rightarrow \frac{|3x + 5|}{5} = \frac{|5x - 1|}{13}$$

$$13(3x + 5) = \pm 5(5x - 1)$$

$$39x + 65 = 25x - 5 \Rightarrow 14x = -70$$

$$\therefore x = -5$$

or

$$39x + 65 = -25x + 5 \Rightarrow 64x = -60$$

$$\therefore x = -\frac{15}{16}$$

ANSWERS: $(-5, 0)$, $(-\frac{15}{16}, 0)$

Question 1 (b)

$$\tan \theta = \left| \frac{\frac{t}{10} - (-\frac{3}{4})}{1 + \frac{t}{10}(-\frac{3}{4})} \right| = \left| \frac{4t + 30}{40 - 3t} \right|$$

$$\tan \theta = \left| \frac{m_1 - m_2}{1 + m_1 m_2} \right|$$

$$\tan \theta = \left| \frac{-2 - (-\frac{3}{4})}{1 + (-2)(-\frac{3}{4})} \right| = \left| \frac{-8 + 3}{4 + 6} \right| = \left| \frac{-5}{10} \right| = \left| \frac{1}{2} \right|$$

$$\therefore \frac{4t + 30}{40 - 3t} = \pm \frac{1}{2}$$

$$2(4t + 30) = 1(40 - 3t)$$

$$8t + 60 = 40 - 3t$$

$$11t = -20 \Rightarrow t = -\frac{20}{11}$$

or

$$2(4t + 30) = -1(40 - 3t)$$

$$8t + 60 = -40 + 3t$$

$$5t = -100 \Rightarrow t = -20$$

