Coordinate geometry – A2 Mathematics P1

1. June/2022/Paper_7357/01/No.1

A curve is defined by the parametric equations

$$x = \cos\theta \quad \text{and} \quad y = \sin\theta \qquad \text{where } 0 \leq \theta \leq 2\pi$$

Which of the options shown below is a Cartesian equation for this curve?

Circle your answer.

[1 mark]

$$\frac{y}{x} = \tan\theta \qquad x^2 + y^2 = 1 \qquad x^2 - y^2 = 1 \qquad x^2y^2 = 1$$

2. June/2022/Paper_7357/01/No.8

The lines L_1 and L_2 are parallel.

L_1 has equation

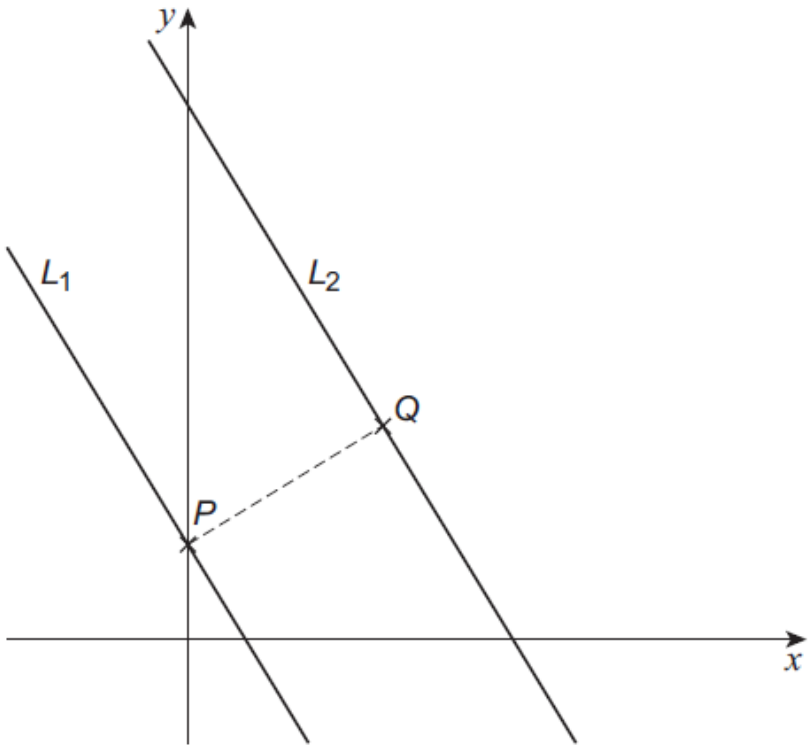
$$5x + 3y = 15$$

and L_2 has equation

$$5x + 3y = 83$$

L_1 intersects the y-axis at the point P.

The point Q is the point on L_2 closest to P, as shown in the diagram.



(a) (i) Find the coordinates of Q.

[5 marks]

(a) (ii) Hence show that $PQ = k\sqrt{34}$, where k is an integer to be found.

[2 marks]

(b) A circle, C, has centre $(a, -17)$.

L_1 and L_2 are both tangents to C.

(b) (i) Find a.

[2 marks]

(b) (ii) Find the equation of C.

[2 marks]