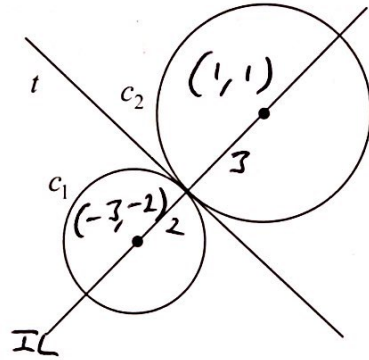


Question 4

(25 marks)

The circles c_1 and c_2 touch externally as shown.

$$\sqrt{1^2 + 1^2 + 7} = \sqrt{9} = 3$$



(a) Complete the following table:

Circle	Centre	Radius	Equation
c_1	$(-3, -2)$	2	$(x+3)^2 + (y+2)^2 = 4$
c_2	$(1, 1)$	3	$x^2 + y^2 - 2x - 2y - 7 = 0$

(b) (i) Find the co-ordinates of the point of contact of c_1 and c_2 .

Divide $(1, 1)$ and $(-3, -2)$ in ratio 3:2

$$\therefore \left(\frac{1(2) + (-3)(3)}{3+2}, \frac{1(2) + (-2)(3)}{3+2} \right)$$

$$= \left(-\frac{7}{5}, -\frac{4}{5} \right)$$

(ii) Hence, or otherwise, find the equation of the tangent, t , common to c_1 and c_2 .

Slope $IL = \frac{1+2}{1+3} = \frac{3}{4}$

\therefore Slope $t = -\frac{4}{3}$

\therefore Egn: $y + \frac{4}{5} = -\frac{4}{3} \left(x + \frac{7}{5} \right)$

$\therefore 15y + 12 = -20x - 28$

$\therefore 20x + 15y + 40 = 0$

$\therefore 4x + 3y + 8 = 0$

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