

QUESTION 2

Find the equation of the circle having $(1, -2)$ as its centre and passing through $3x + y = 14$, $2x + 5y = 18$.

Sol: Given lines are $3x + y = 14$ and $2x + 5y = 18$.

Solving these equations, we get point of intersection of the lines as $A(4, 2)$.

Now circle with centre $C(1, -2)$ passes through $A(4, 2)$.

$$\therefore \text{Radius} = AC = \sqrt{(4-1)^2 + (2+2)^2} = \sqrt{9+16} = 5$$

So, equation of the required circle is:

$$(x-1)^2 + (y+2)^2 = 5^2$$

$$\Rightarrow x^2 - 2x + 1 + y^2 + 4y + 4 = 25 \Rightarrow x^2 + y^2 - 2x + 4y - 20 = 0$$