

Simple Co-ordinate geometry problems

1. Find the equation of straight line passing through the point $P(5,2)$ with equal intercepts.

2. Consider a circle with center $(4,5)$ and with radius of 8

If the tangent lines of the circle has slope $\frac{1}{3}$.

Find :

- (a) the points of contact of these tangent lines and the circle,
- (b) the equation of the tangent lines.

3. Find the value(s) of m such that $(2m^3 + m^2 - m)x^2 + (m^3 - m^2 + 2m)y^2 - 8m + 18 = 0$ represents the equation of a circle.

4. Find the equation of a circle C_1 passing through the intersection points of

$$\begin{cases} L: x - 3y + 4 = 0 \\ C: x^2 + y^2 + 2x - 6y + 2 = 0 \end{cases}$$

and with the smallest area.

