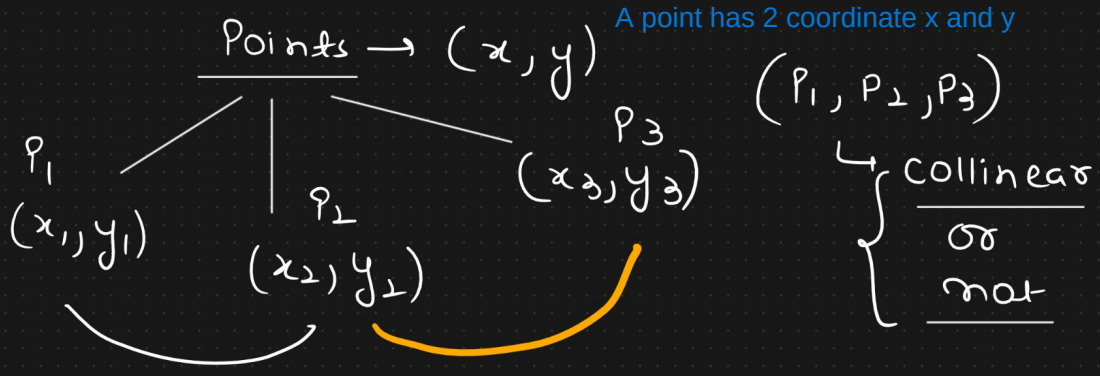
Collinear Points

Problem statement: We are provided with some points. We need to determine whether these points are collinear(lieing on the same line) or not?



$$m_1 = \frac{y_2 - y_1}{x_2 - x_1} \qquad m_2 = \frac{y_3 - y_2}{x_3 - x_2}$$

Approach 1

Slope of the line formed by joining the adjacent points will be equal in case points are collinear.

$m_1 = m_2$ → Points are collinear

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{y_3 - y_2}{x_3 - x_2}$$

$$(y_2 - y_1)(x_3 - x_2) = (x_2 - x_1)(y_3 - y_2)$$

Approach 2

If we apply the area of Triangle formula for the collinear points then it will be equivalent to 0.

Area of triangle = 0 (collinear)

$$\Rightarrow \frac{1}{2}\left(x_1 * (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)\right)$$