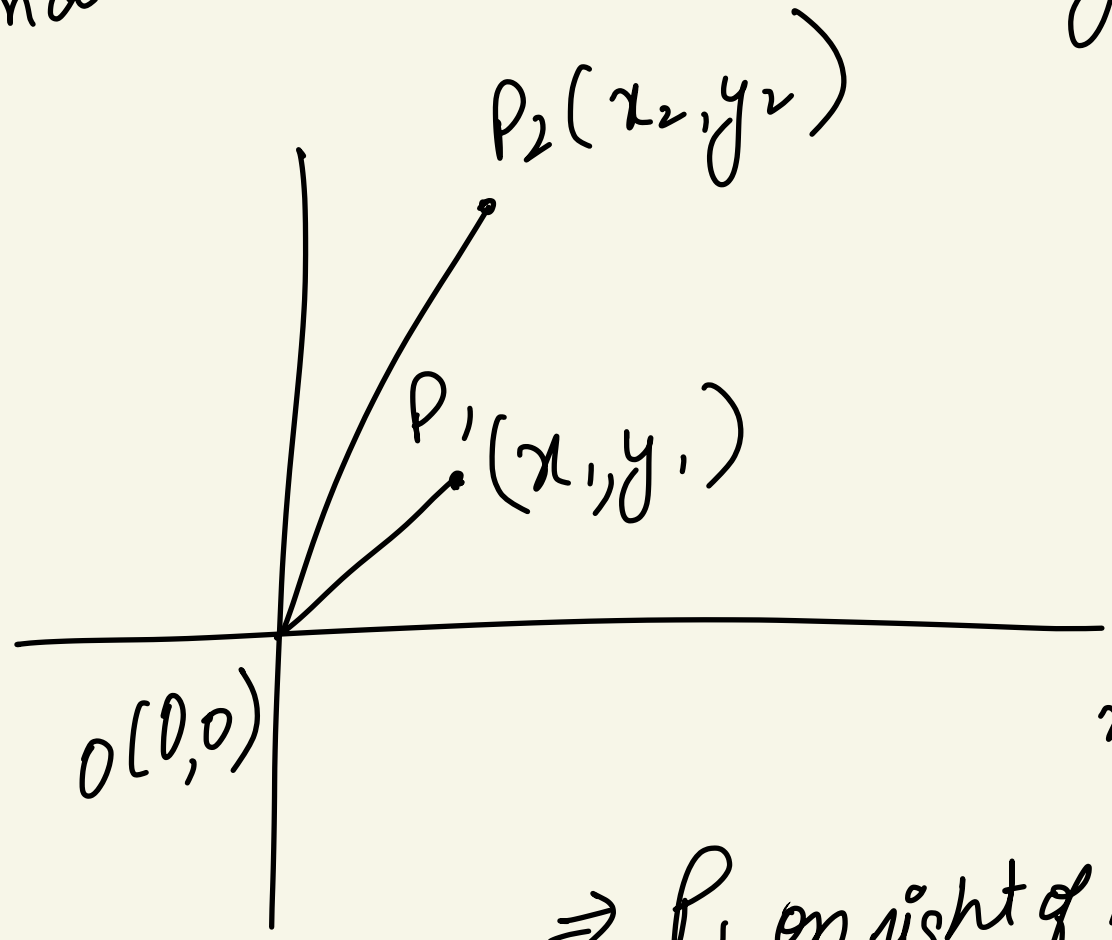
Given Two points. $P_1(x_1, y_1)$

$P_2(x_2, y_2)$

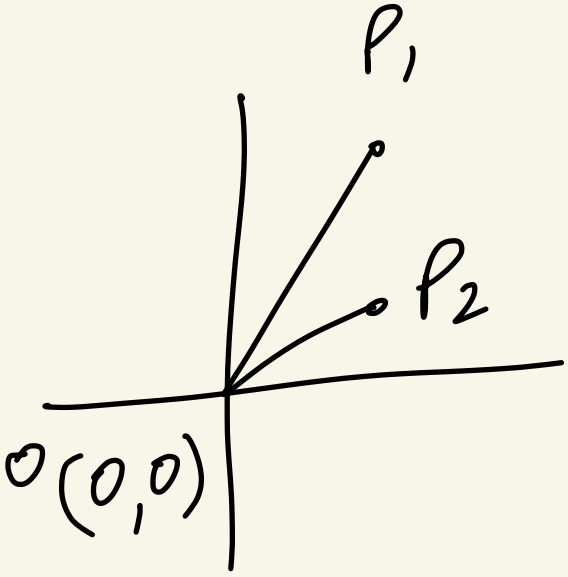
find where P_2 lies when looking from O to P_1



$\frac{y_2}{x_2} > \frac{y_1}{x_1}$

$x_1 y_2 - x_2 y_1 > 0$

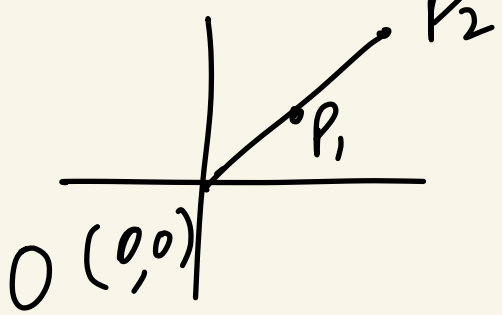
$\Rightarrow P_1$ on right of P_2



$\frac{y_2}{x_2} < \frac{y_1}{x_1}$

$x_1 y_2 - x_2 y_1 < 0$

$\Rightarrow P_1$ on left of P_2

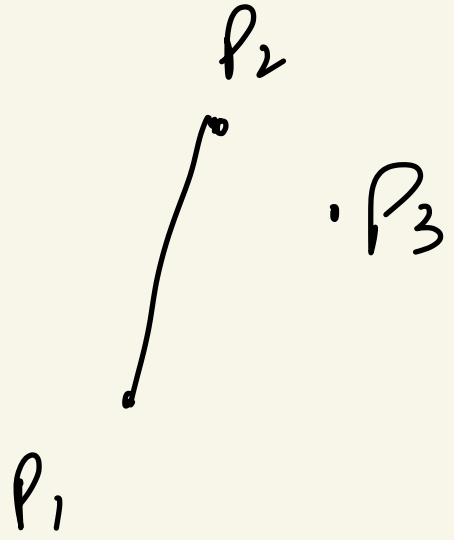


$$\frac{y_2}{x_2} = \frac{y_1}{x_1}$$

$$x_1 y_2 - x_2 y_1 = 0$$

$\Rightarrow$ P_2 on line joining OP_1

Now, consider if we have 3 points. We have to tell where P_3 lies wrt. $P_1 P_2$



we can shift P_2 & P_3 by P_1, so that P_1 becomes origin. and follow similar analysis

$$x_2 y_3 - x_3 y_2 < 0$$

P_2 on left of P_3