



Blue Print (As per PU Board)

Topic	1 mark questions	2 marks questions	3 marks questions	5 marks questions	Total Marks
Straight Lines	1	2	-	1	10

One mark questions

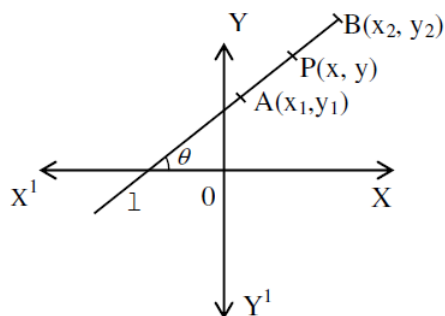
1. **Define a straight line.**  
Answer: It is the locus of point which maintains the least distance between ends.
2. **Define slope of a straight line.**  
Answer: It is defined as tangent of inclination. i.e.  $m = \tan \theta$
3. **Give the condition of parallel lines.**  
Answer: Slopes of parallel lines are equal.
4. **Give the condition of perpendicular lines.**  
Answer: Product of slopes of perpendicular lines is  $-1$ .

Two marks questions

5. **Find slope and y-intercept of the following (1)  $2x + 3y - 1 = 0$ .**  
Answer:  $\Rightarrow 3y = -2x + 1 \therefore y = \frac{-2}{3}x + \frac{1}{3} \therefore m = -\frac{2}{3}; c = \frac{1}{3}$   
(2)  $x + y - 2 = 0 \therefore m = -1, C = 2$  by comparing with  $y = mx + C$ .
6. **Find the perpendicular distance of  $P(1, 2)$  from  $l: 3x + 4y - 13 = 0$ .**  
Answer: Given  $x_1 = 1, y_1 = 2; a = 3; b = 4; c = -13$   $d = ?$   
$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} \therefore d = \frac{|3(1) + 4(2) - 13|}{\sqrt{9 + 16}}$$
  
$$= \frac{|3 + 8 - 13|}{\sqrt{25}} = \frac{2}{5}$$
7. **Find inclination of a straight line joining  $A(11, 10)$  &  $B(10, 9)$ .**  
Answer: Given  $x_1 = 11, y_1 = 10; x_2 = 10, y_2 = 9$   
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 10}{10 - 11} = \frac{-1}{-1} = 1 \therefore \tan \theta = 1 \therefore \theta = 45^\circ$$

8. **Obtain equation of a straight line in the form of  $\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$**

Answer: Consider a straight line  $\lambda$  passing through  $A(x_1, y_1)$  &  $A(x_2, y_2)$ . Let  $P(x, y)$  be any point on  $\lambda$ .



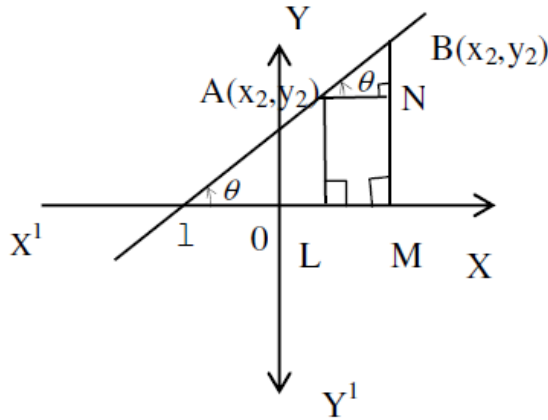


Since  $AP$  and  $AB$  are parts of same line  $\lambda$ , slope  $AP =$  slope of  $AB$

$$\Rightarrow \frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow \frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

9. Obtain an expression for slope of a line joining  $A(x_1, y_1)$  &  $B(x_2, y_2)$ .

Answer: Consider an expression for slope of a line joining  $A(x_1, y_1)$  &  $B(x_2, y_2)$ . If  $m$  &  $\theta$  are slope and inclination of then  $m = \tan \theta$  & slope of  $AB = m$ .



From the figure  $OL = x_1, OM = x_2, AL = y_1, BM = y_2$  &  $\therefore \hat{BAN} = \theta$   
 ( $\because$  corresponding angles)

$$\therefore \text{In } \triangle ANB, \tan \theta = \frac{BN}{AN} \Rightarrow m = \frac{BM - MN}{LM}$$

$$= \frac{BM - AL}{OM - OL} = \frac{y_2 - y_1}{x_2 - x_1}$$

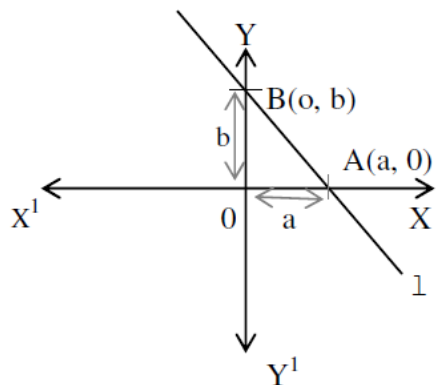
**Three marks questions**

10. Obtain equation of a straight line in the form of  $\frac{x}{a} + \frac{y}{b} = 1$ .

Answer: Consider a straight line  $\lambda$  whose intercepts are  $\alpha$  and  $\beta$ . If  $\lambda$  cuts  $OX$  at  $A$  and  $OY$  at  $B$  then  $OA = a$  &  $OB = b$   $\therefore \lambda$  passes through  $A(a, 0)$  &  $B(0, b)$

$$\therefore \text{equation of line is } \frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

$$\text{i.e., } \frac{y - 0}{b - 0} = \frac{x - a}{0 - a} \Rightarrow \frac{y}{b} = \frac{x - a}{-a} \therefore \frac{y}{b} = \frac{-x}{a} + 1 \Rightarrow \frac{x}{a} + \frac{y}{b} = 1$$



11. Find the ratio

equation of straight line whose intercepts are in of 2 & 3 given that it passes through  $P(1, 2)$

Answer:

Let  $a = 2k : b = 3k, x_1 = 1; y_1 = 2$  (given)

$$\text{Required equation is } \frac{x}{a} + \frac{y}{b} = 1$$



i.e.  $\frac{x}{2k} + \frac{y}{3k} = 1 \Rightarrow \frac{3x+2y}{6k} = 1 \Rightarrow 3x+2y-6k=0$  since it passes through  $P(1,2)$

$3+2-6k=0 \therefore 6k=5 \therefore l$  is  $3x+2y-5=0$ .

12. Find equation of a straight line which is parallel to  $2x+3y+1=0$  given that i) it passes through  $P(3, 2)$ .

Answer: Given  $\lambda^1: 2x+3y+1=0$  since  $\lambda$  is parallel to  $\lambda^1$ ,  $\lambda: 2x+3y+c=0$

As it passes through  $(3, 2)$ ,  $6+6+c=0 \Rightarrow c=-12 \therefore \lambda: 2x+3y-12=0$

(ii) its  $y$ -intercept is 2

Given  $\lambda^1: 2x+3y+1=0$  since  $\lambda$  is parallel to  $\lambda^1: 2x+3y+c=0$

its  $y$ -intercept  $= -\frac{c}{3} = 2 \therefore c = -6 \therefore \lambda: 2x+3y-6=0$