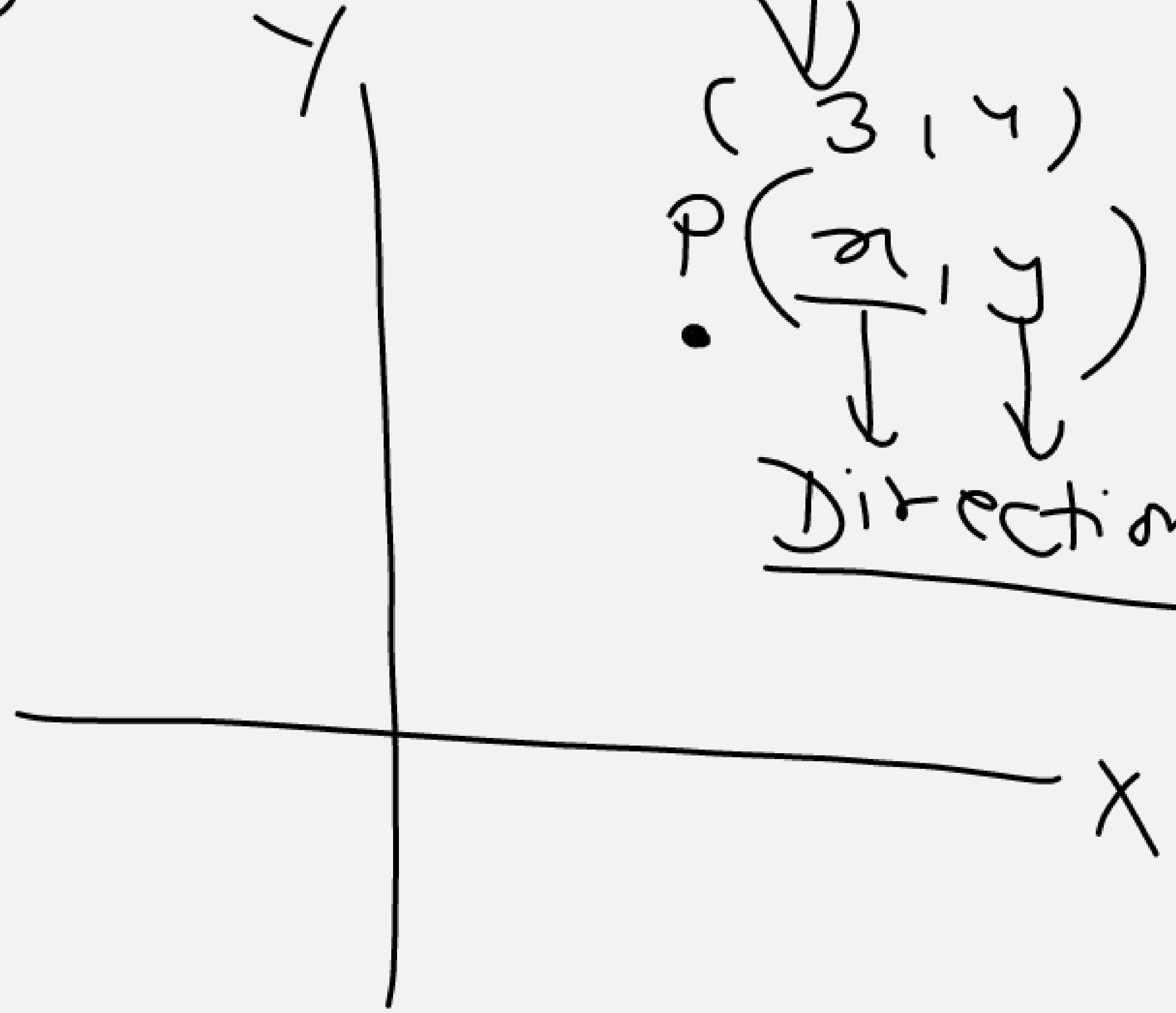
Vectors

a Quantity which has both $\boxed{\text{Direction}}$ & $\boxed{\text{Magnitude}}$

Geometry



$(3, 4)$

$P(x, y)$

Direction

Vector :-

$\vec{5}$ → x axis

y axis

z axis

$5\hat{i}$

initial

final

A

B

l

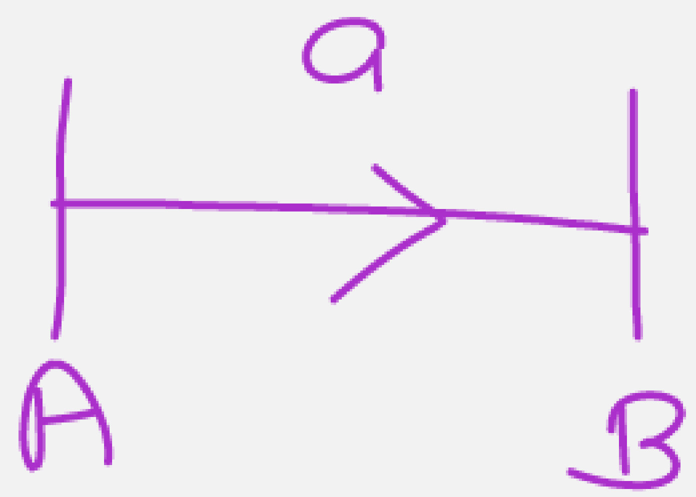
length

segment

-ive

(5, 3)

$5\hat{i}, 3\hat{j}, 8\hat{k}$



$\overrightarrow{AB} = \vec{a}$

$|\overrightarrow{AB}| = |\vec{a}|$

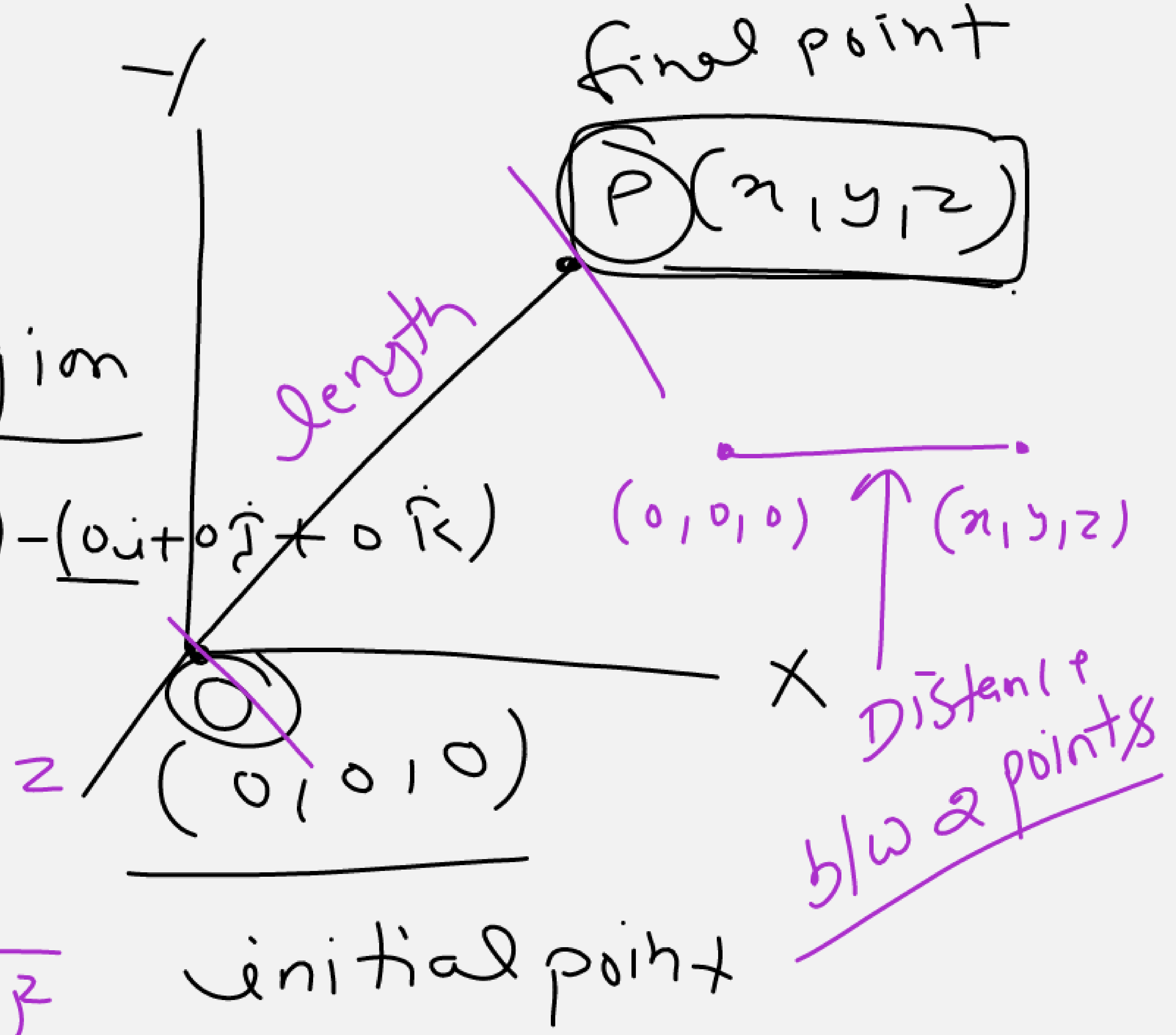
position vector :-

↓

point position wr to origin

So :- $\overrightarrow{OP} \Rightarrow \vec{P} - \vec{O} = (x\hat{i} + y\hat{j} + z\hat{k}) - (0\hat{i} + 0\hat{j} + 0\hat{k})$

$$\boxed{\overrightarrow{OP} = (x\hat{i} + y\hat{j} + z\hat{k})}$$



magnitude :-

$$|\overrightarrow{OP}| = \sqrt{(x-0)^2 + (y-0)^2 + (z-0)^2}$$

$$|\overrightarrow{OP}| = \sqrt{x^2 + y^2 + z^2}$$

2 points:

$A \to \vec{A} = x_1\hat{i} + y_1\hat{j} + z_1\hat{k}$

$B \to \vec{B} = x_2\hat{i} + y_2\hat{j} + z_2\hat{k}$

$A\,(x_1, y_1, z_1) \qquad B\,(x_2, y_2, z_2)$

$$\vec{AB} = \vec{B} - \vec{A} = (x_2\hat{i} + y_2\hat{j} + z_2\hat{k}) - (x_1\hat{i} + y_1\hat{j} + z_1\hat{k})$$

$$\boxed{\vec{AB} = (x_2 - x_1)\hat{i} + (y_2 - y_1)\hat{j} + (z_2 - z_1)\hat{k}}$$

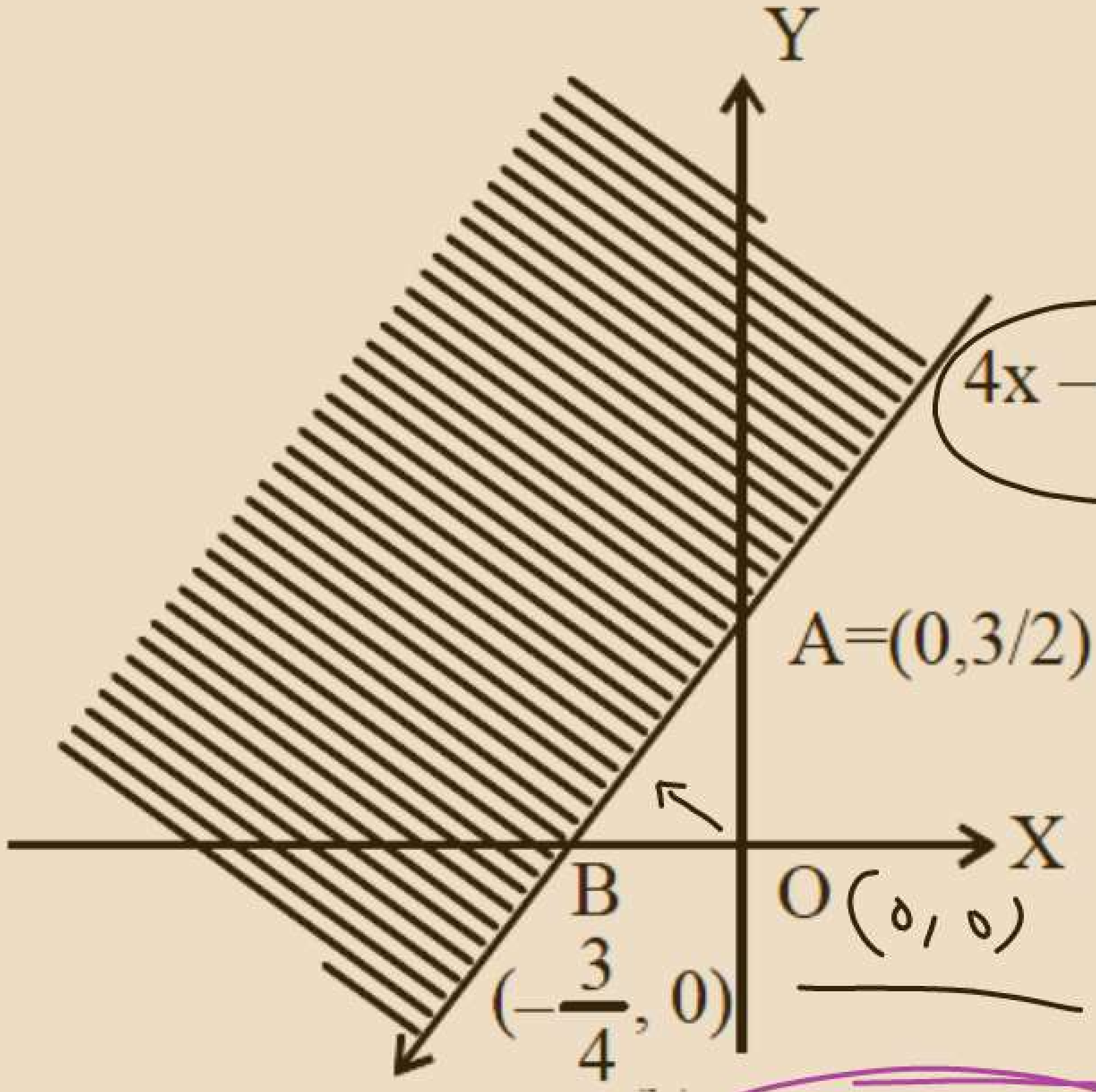
$$\vec{AB} \neq \vec{BA}$$

$$|\vec{AB}| = |\vec{BA}|$$

Shaded region is represented by

\# 30 oct.

ABLES KOTA



$[4x - 2y \leq -3]$

when put (0, 0) and its false → region away from (0, 0)

$0 - 0 \quad -3$

$0 \leq -3$

↓

False

(a) $4x - 2y \leq 3$

(b) $4x - 2y \leq -3$

(c) $4x - 2y \geq 3$

(d) $4x - 2y \geq -3$

The maximum value of $z = 5x + 2y$, subject to the constraints $x + y \le 7$, $x + 2y \le 10$, $x, y \ge 0$ is

(a) 10 (b) 26

(c) 35 (d) 70

$x + y \le 7 \rightarrow$ True $\downarrow$ Toward

x	0	7
y	7	0

$x + 2y \le 10 \rightarrow$ True $\downarrow$

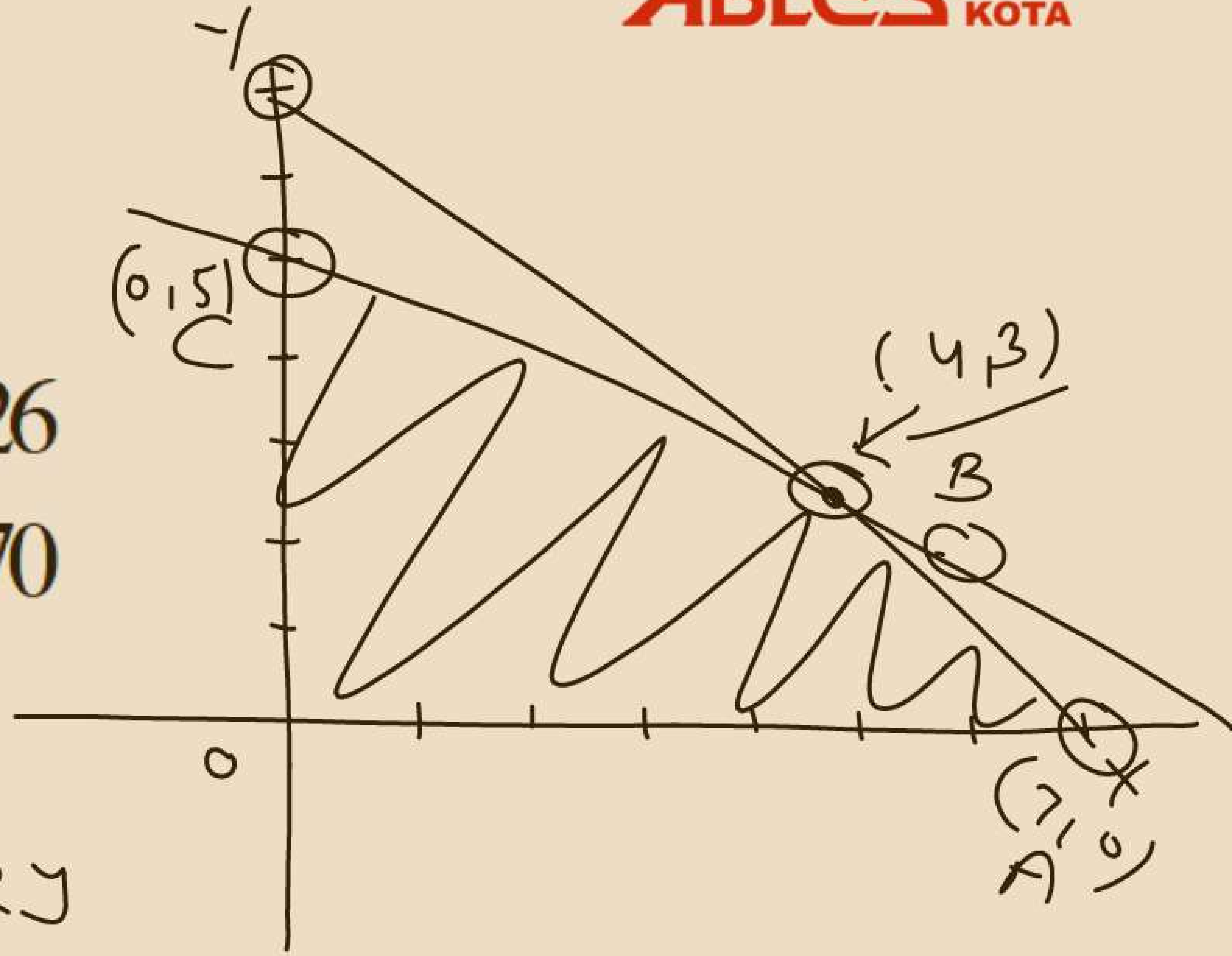
x	0	6
y	5	2

$z = 5x + 2y$

$A \rightarrow z = 35$

$B \rightarrow z = 20 + 6 = 26$

$C \rightarrow z = 10$

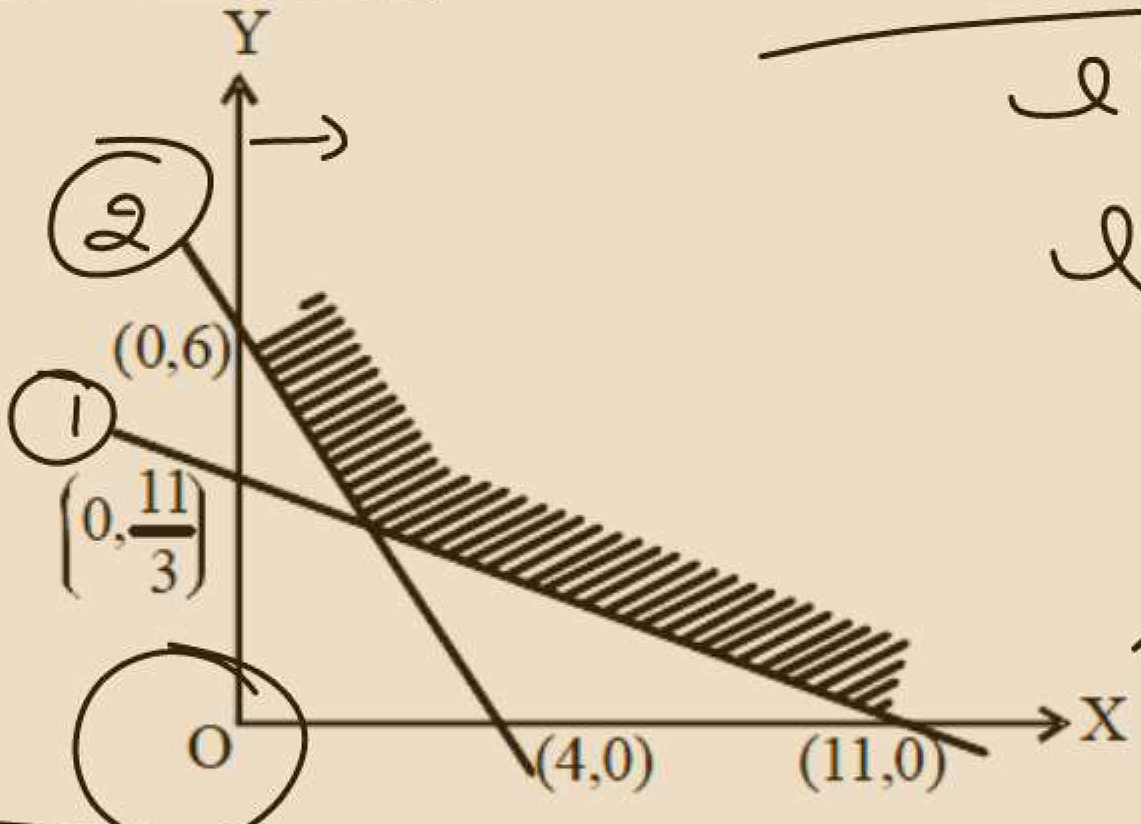


For the following feasible region, the linear constraints are → subject to:-

line 1 → false (0,0)

line 2 → false (0,0)

eq. →



(a) $x \geq 0,\ y \geq 0,\ 3x + 2y \geq 12,\ x + 3y \geq 11$

(b) $x \geq 0,\ y \geq 0,\ 3x + 2y \leq 12,\ x + 3y \geq 11$

(c) $x \geq 0,\ y \geq 0,\ 3x + 2y \leq 12,\ x + 3y \leq 11$

(d) None of these

Objective function of a L.P.P. is

(a) a constant

(b) a function to be optimised

(c) a relation between the variables

(d) None of these

an eq. which can be solved.

If a point (h, k) satisfies an inequation $ax + by \geq 4$, then the half plane represented by the inequation is

(a) The half plane containing the point (h, k) but excluding the points on $ax + by = 4$

(b) The half plane containing the point (h, k) and the points on $\boxed{ax + by = 4}$

(c) Whole xy-plane

(d) None of these

$\boxed{ax + by \geq 4}$

$>$ greater than

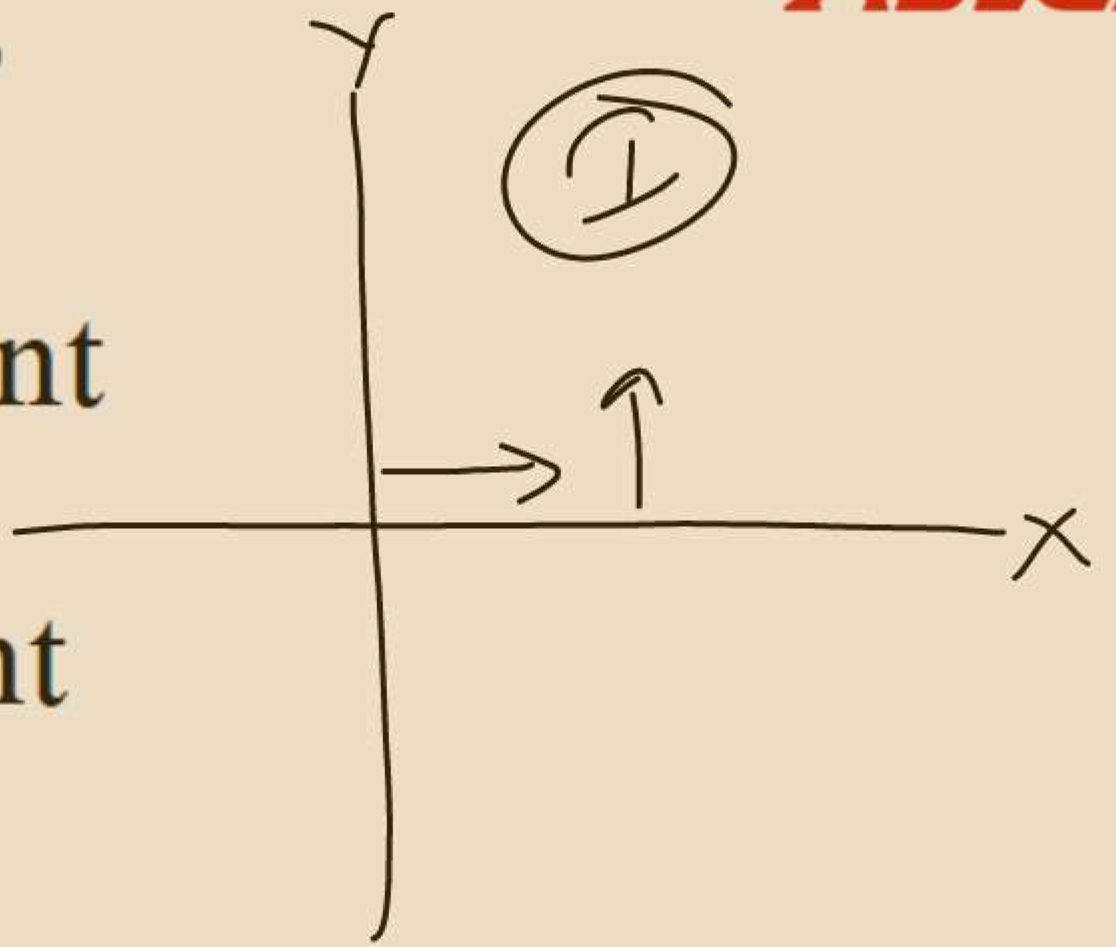
$=$ equal

half plane

Region represented by $x \geq 0$, $y \geq 0$ is

(a) first quadrant (b) second quadrant

(c) third quadrant (d) fourth quadrant

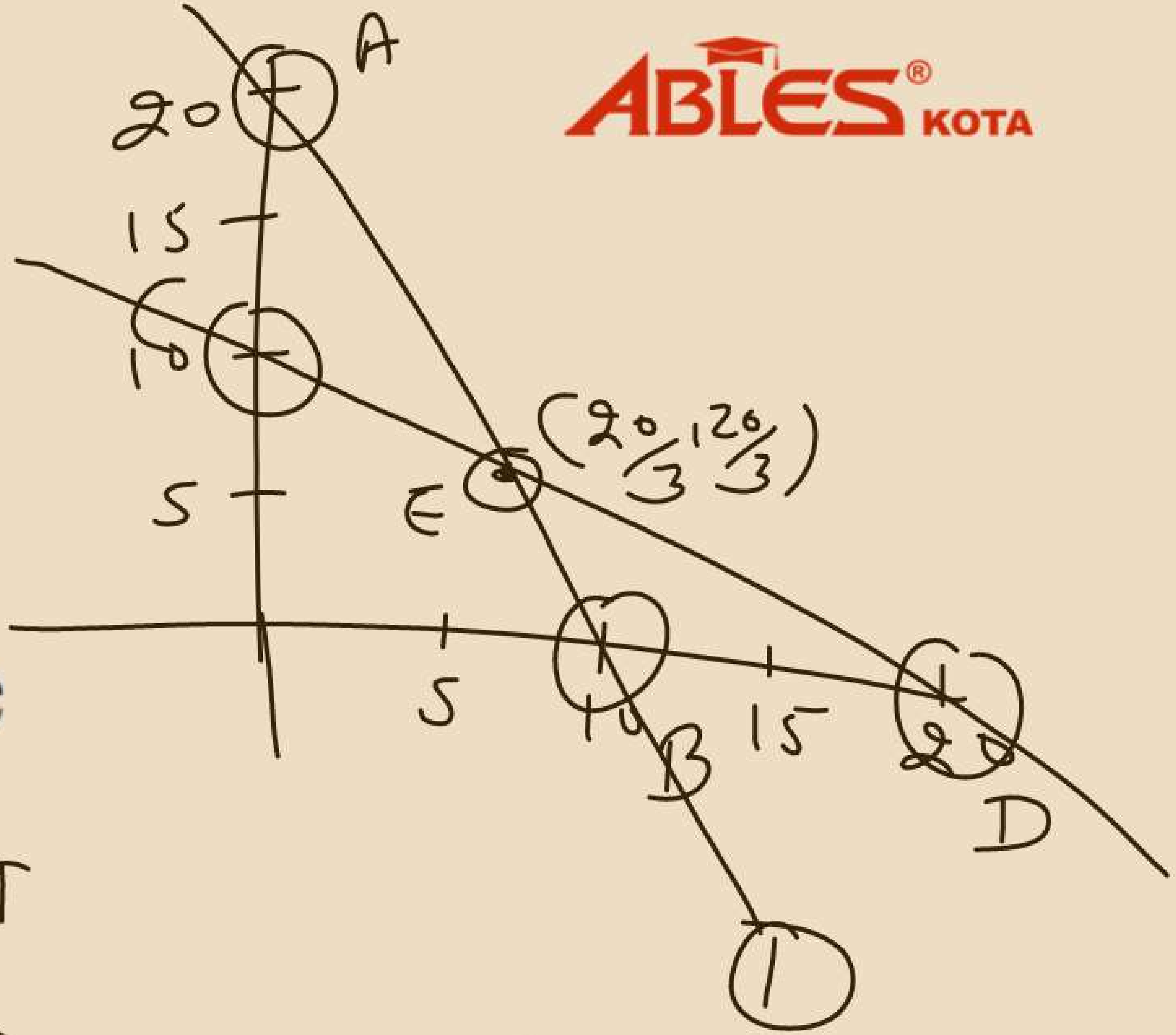


The maximum value of $P = x + 3y$ such that $2x + y \leq 20$, $x + 2y \leq 20$, $x \geq 0$, $y \geq 0$ is

(a) 10 (b) 60

(c) 30 (d) None of these

$\frac{20}{3} + 20 = \frac{80}{3}$



$2x + y \leq 20 \rightarrow T$

x	0	10
y	20	0

$x + 2y \leq 20 \rightarrow T$

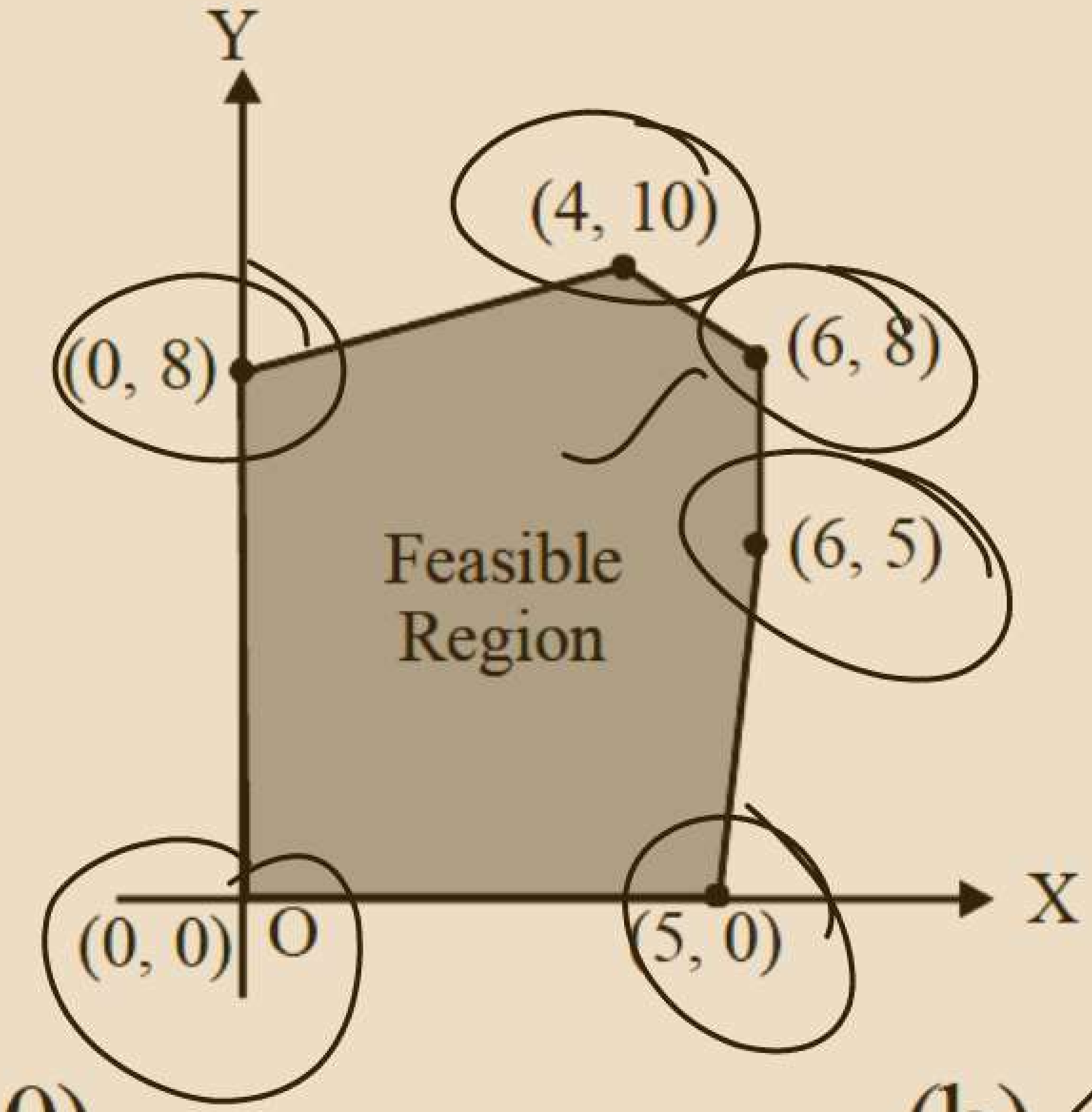
x	0	20
y	10	0

$C[0, 10] \rightarrow P = 30$

$B[10, 0] \Rightarrow P = 10$

$E\left(\frac{20}{3}, \frac{20}{3}\right) \rightarrow P = \frac{80}{3}$

The feasible region for an LPP is shown shaded in the figure. Let $Z = 3x - 4y$ be the objective function. Minimum of Z occurs at



(a) (0, 0) (b) (0, 8)

(c) (5, 0) (d) (4, 10)

$z = 3x - 4y$

$(0,8) \to -32$

$(4,10) \to -28$

$(6,8) \to -14$

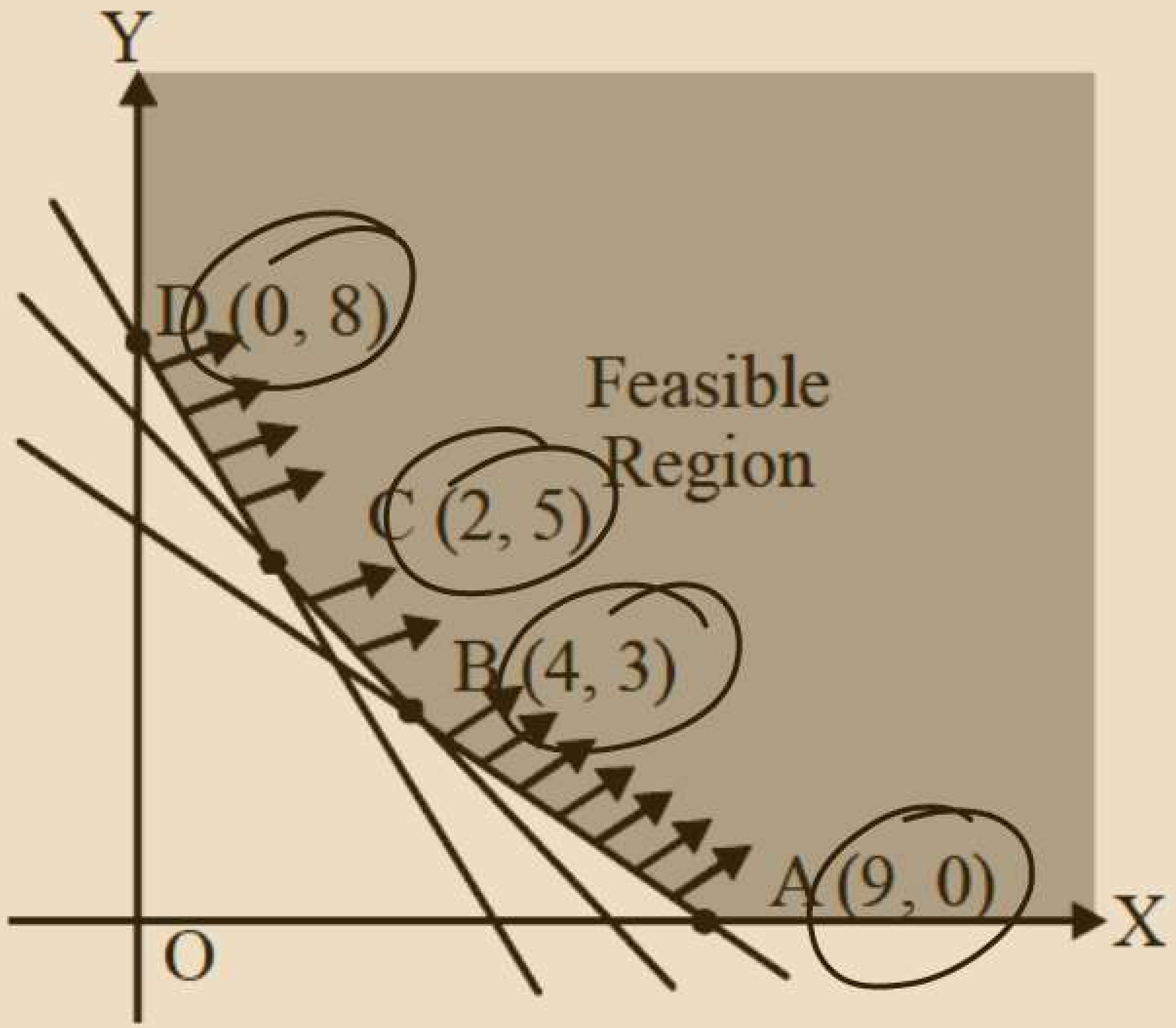
$(6,5) \to -2$

$(5,0) = 15$

$(0,0) \to 0$

32
18

Feasible region for an LPP is shown shaded in the following figure. Minimum of $Z = 4x + 3y$ occurs at the point.



$Z = 4x + 3y$

$(0,8) \to 24$

$(2,5) = 23$

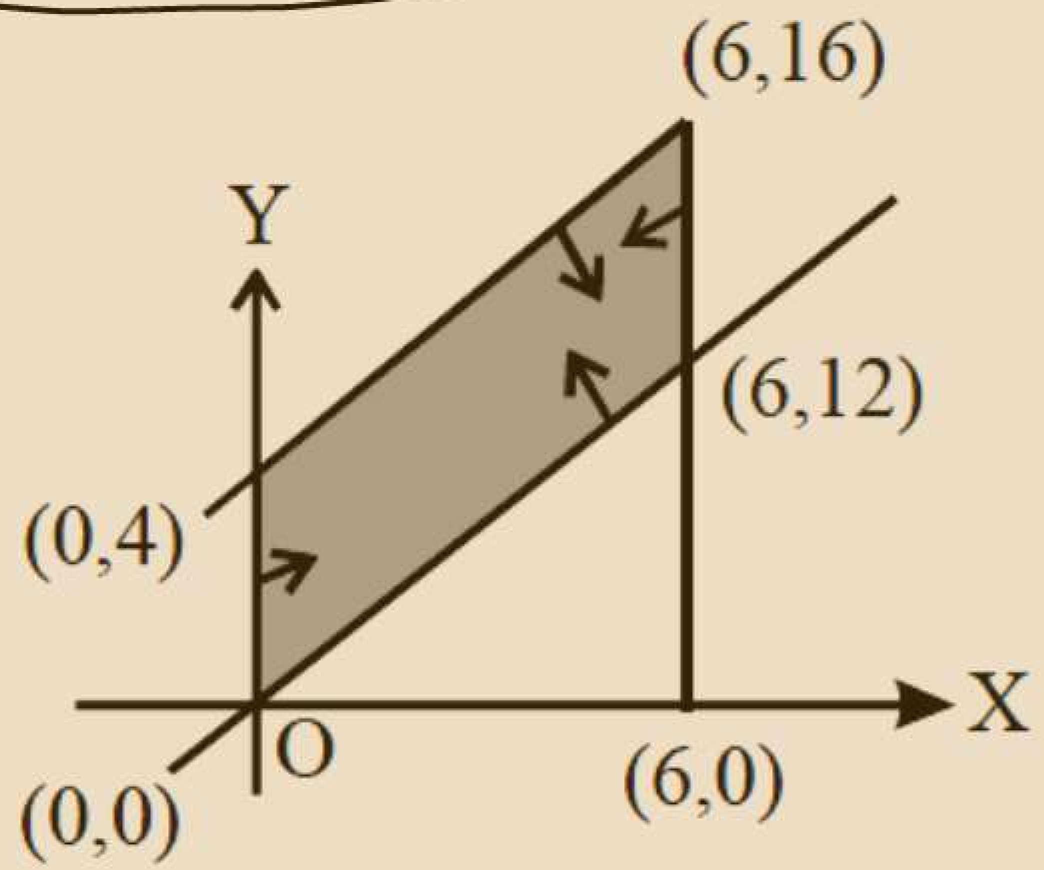
$(4,3) = 25$

$(9,0) = 36$

(a) (0, 8) (b) (2, 5)

(c) (4, 3) (d) (9, 0)

The feasible region for LPP is shown shaded in the figure. Let $f = 3x - 4y$ be the objective function, then maximum value of f is



(a) 12 (b) 8

(c) 0 (d) –18

$f = 3x - 4y$

$(0,0) \to 0$

$(0,4) \to -16$

$(6,16) \to -46$

$(6,12) \to -30$

64
18
46

18
48