ULTIMATE KCET

CRASH COURSE 2026

Mathematics | One Shot

LPP

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Question

Corner points of the feasible region determined by the system of linear constraints are (0,3), (1,1) and (3,0). Let $z = px + qy$, where $p, q > 0$. Condition on p and q so that the minimum of z occurs at (3,0) and (1,1) is [2020]

(A) $p = \frac{q}{2}$

(B) $p = 3q$

(C) $p = q$

(D) $p = 2q$

(3,0) $\quad z_{min} = 3p + 0 = 3p$

(1,1) $\quad z_{min} = p + q$

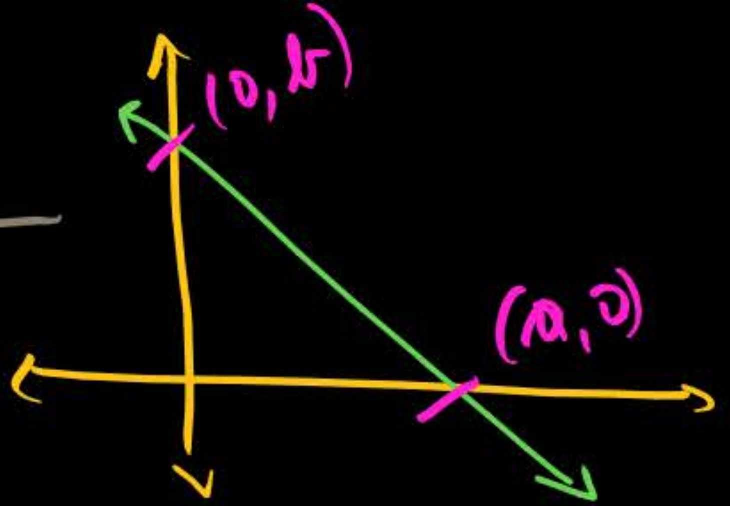
$3p = p + q$

$2p = q$

$p = \frac{q}{2}$

Intercept form of straight line

$$\frac{x}{a}+\frac{y}{b}=1 \leftarrow$$



Given Inequation

$\Downarrow$

convert into eq^n

$\Downarrow$

Find intercepts

$(a,0)$ & $(0,b)$

$$2x+3y\le 24$$

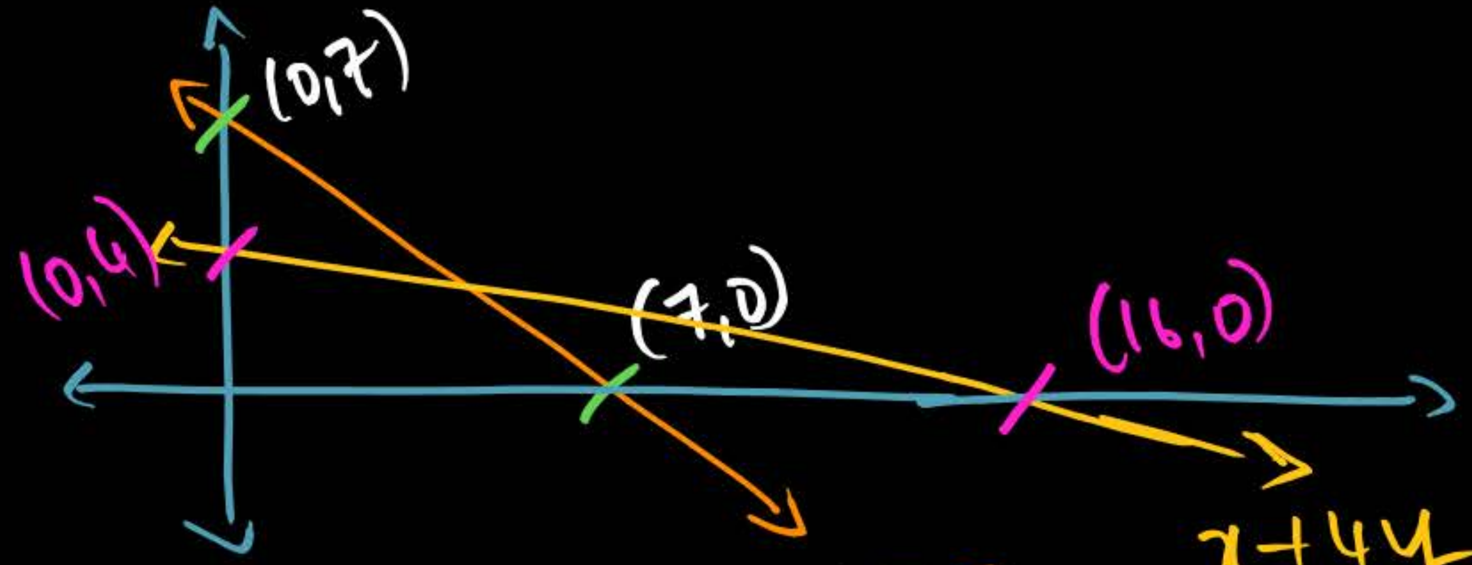
$$\Downarrow$$

$$2x+3y=24$$

$\div$ by 24

$$\frac{x}{12}+\frac{y}{8}=1$$

$(12,0)$ & $(0,8)$



$x+y=7$

$x+4y=16$

$\frac{x}{7}+\frac{y}{7}=1$

$\frac{x}{16}+\frac{y}{4}=1$

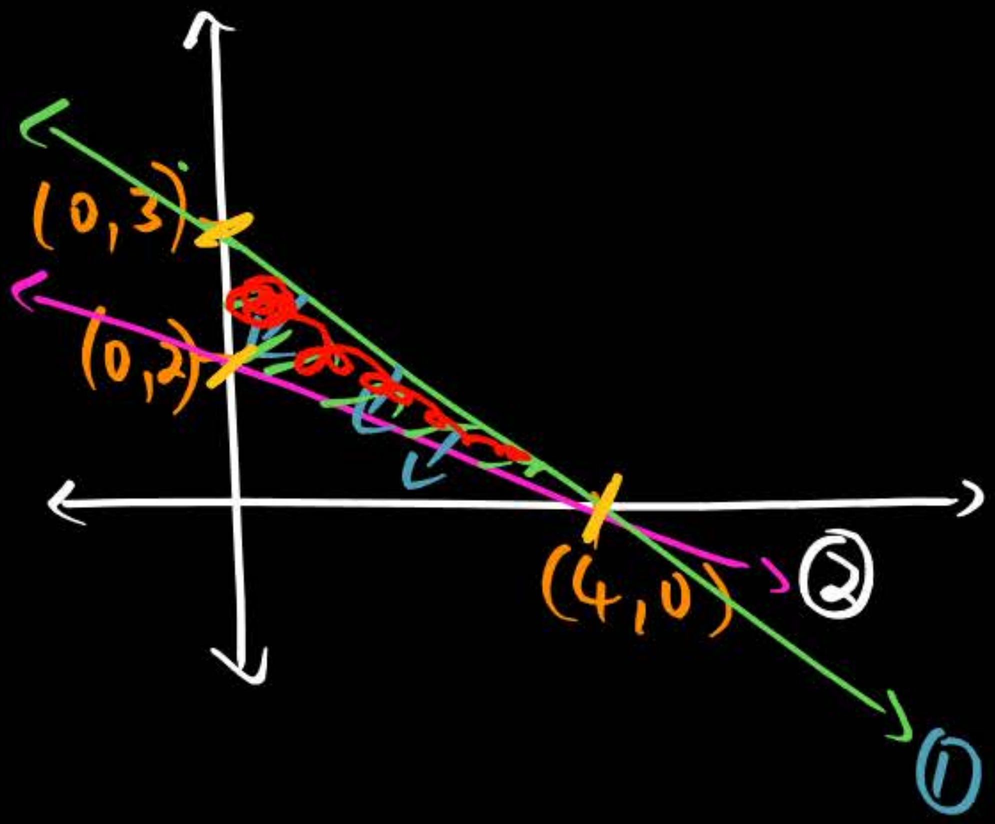
$3x + 4y \leq 12$

$\Downarrow$

$\frac{x}{4} + \frac{y}{3} \leq 1 \rightarrow (1)$

$4x + 8y \geq 16$

$\frac{x}{4} + \frac{y}{2} \geq 1 \rightarrow (2)$



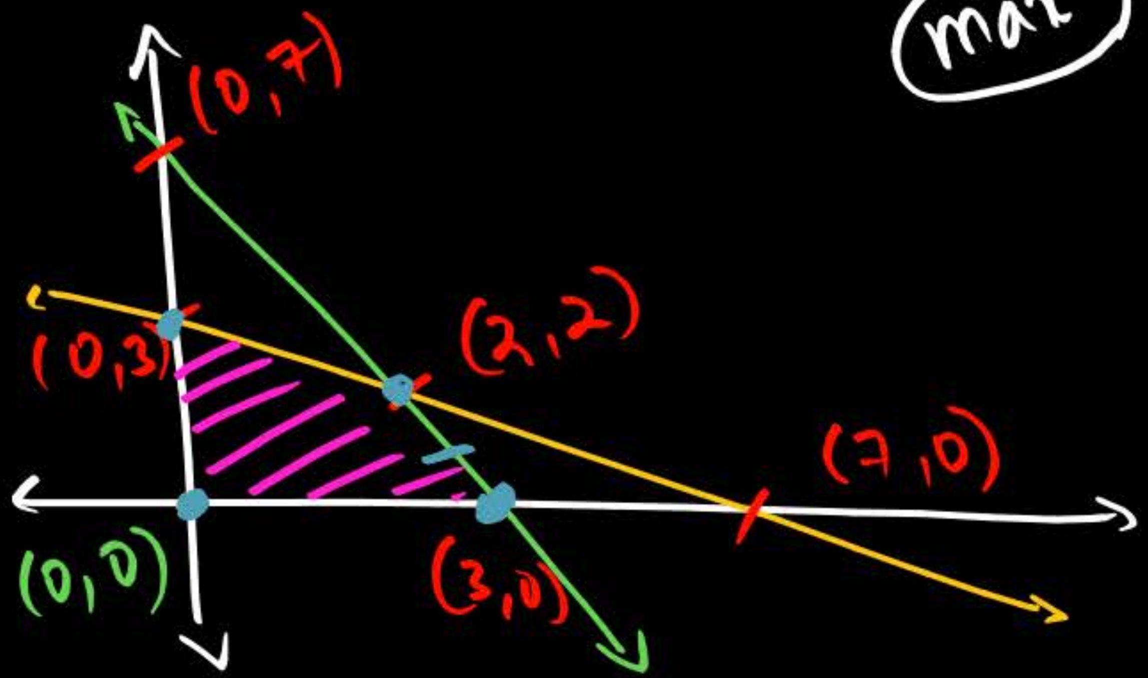
Corner Points

(0,3)

(0,2)

(4,0)

max



Corner Points	$Z = ax+by$	
(0,3)	7	
(2,2)	10 $\rightarrow$	max
(3,0)	10 $\rightarrow$	
(0,0)	0	

The max value of Z
occurs at (2,2) & (3,0)
& also at all the points on the line segment
joining the point (2,2) & (3,0)

$\Downarrow$

Here there are infinitely many solutions

Question

Corner points of the feasible region for an LPP are (0,2), (3,0), (6,0), (6,8) and (0,5). Let $z = 4x + 6y$ be the objective function. The minimum value of z occurs at

	$z = 4x+6y$
(0,2)	12] → min
(3,0)	12
(6,0)	24
(6,8)	24+48=72
(0,5)	30

A Only (0,2)

B Only (3,0)

C The mid-point of the line segment joining the points (0,2) and (3,0)

D Any point on the line segment joining the points (0,2) and (3,0)

Question

The corner points of the feasible region of an LPP are (0,2), (3,0), (6,0), (6,8) and (0,5), then the $\boxed{\text{minimum}}$ value of $z = 4x + 6y$ occurs at

	$z = 4x + 6y$
(0,2)	12
(3,0)	12
(6,0)	24
(6,8)	72
(0,5)	30

$\left.\begin{matrix}12\\12\end{matrix}\right] \to$ min

A ✗ finite number of points

B ✗ only one point

C ✓ infinite number of points

D ✗ only two points

Question

Consider the following statements: $\to z = ax^1 + by^1$

Statement (I): In a LPP, the objective function is always $\boxed{\text{linear.}}$ $\to$ power of x & y is one

Statement (II): Ina LPP, the linear inequalities on variables are called $\boxed{\text{constraints.}}$

Which of the following is correct?

A. Statement (I) is true, Statement (II) is true

B. Statement (I) is true, Statement (II) is false

C. Both Statements (I) and (II) are false

D. Statement (I) is false, Statement (II) is true

Question

The feasible region of an LPP is shown in the figure. If $Z = 11x + 7y$, then the maximum value of Z occurs at

	$11x+7y$
(0,3)	21
(3,2)	33+14=57
(0,0)	0
(5,0)	55

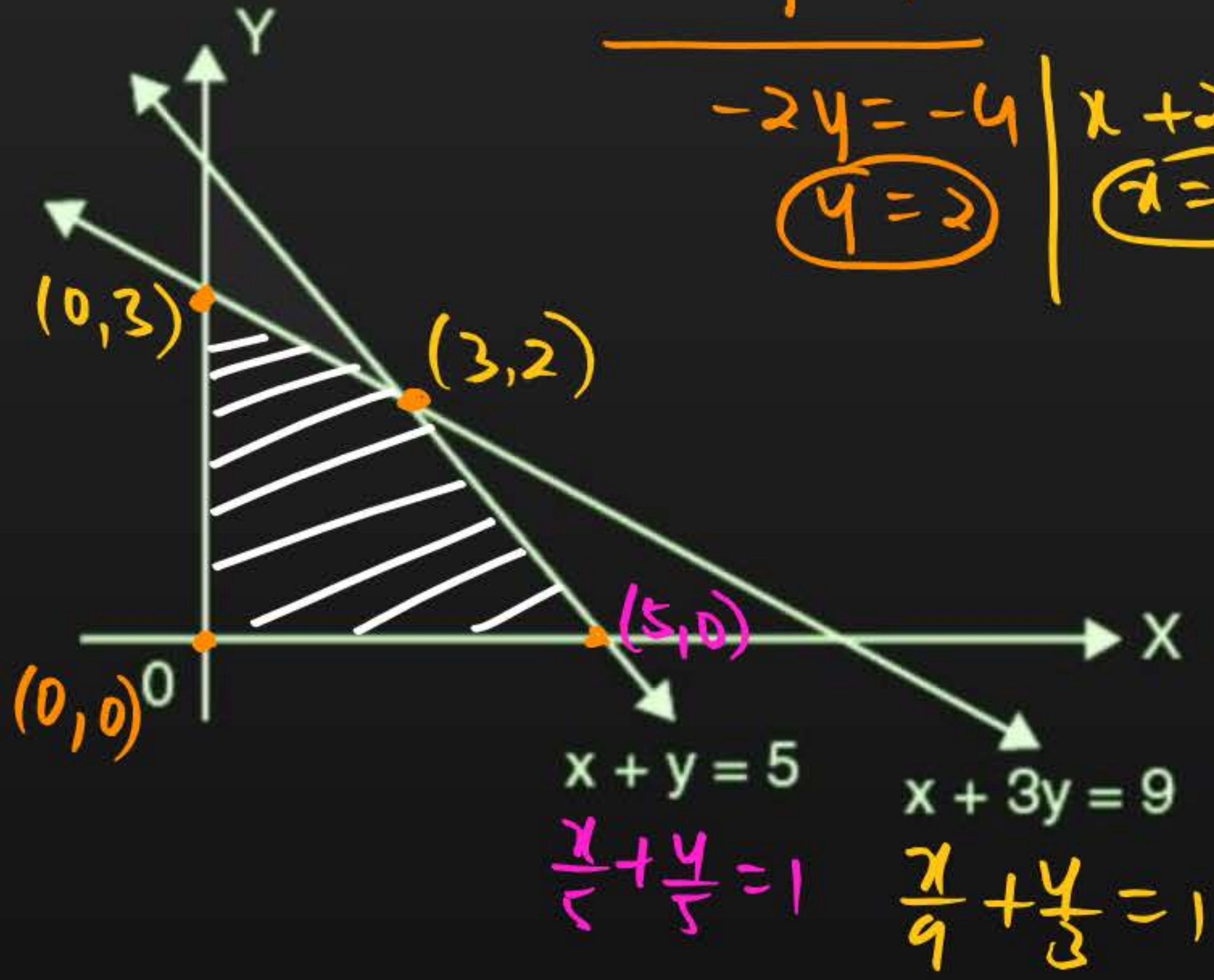
$x+y=5$
$x+3y=9$
$-2y=-4$ | $x+2=5$
$y=2$ | $x=3$

A (3, 2)

B (0, 5)

C (3, 3)

D (5, 0)



Question

1^{st} quad

$5x+4y \geq 20$ | $x \geq 0$

$x \leq 6$ | $y \geq 0$

$y \leq 3$

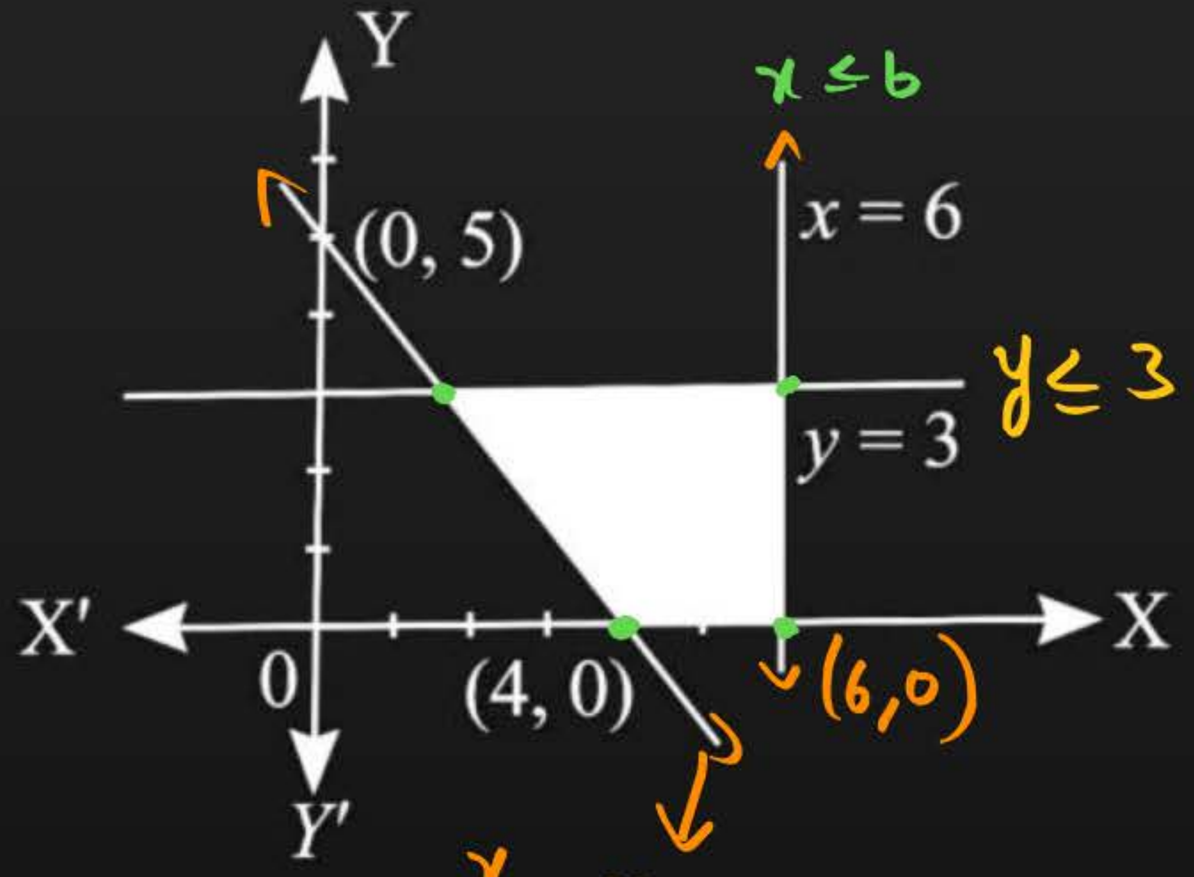
The shaded region is the solution set of the inequalities. [2021]

(A) $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$

(B) $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(C) $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(D) $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$



$\frac{x}{4}+\frac{y}{5}=1$

$5x+4y=20$

Question

$2x-3y=-6$

$0 \geq -6$

The shaded region in the figure given is the solution of which of the inequations?

$2x-3y \geq -6$

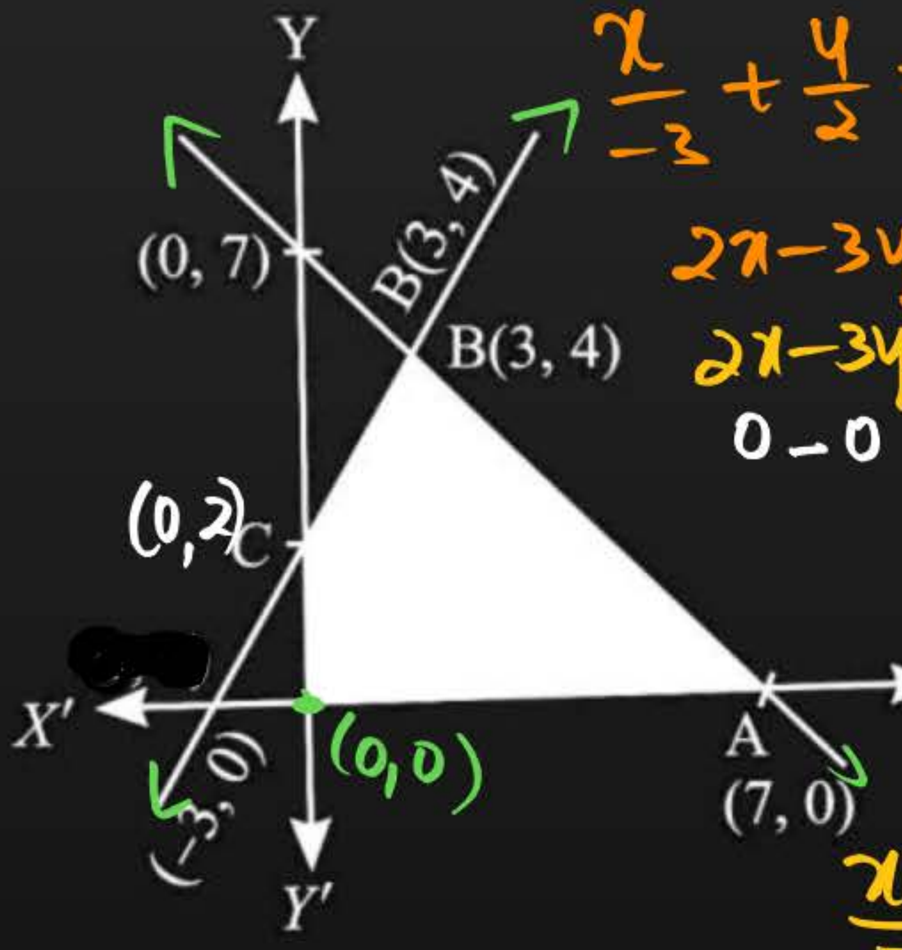
$x+y \leq 7$

A $x+y \geq 7, 2x-3y+6 \geq 0, x \geq 0, y \geq 0$

B $x+y \leq 7, 2x-3y+6 \geq 0, x \geq 0, y \geq 0$

C $x+y \leq 7, 2x-3y+6 \leq 0, x \geq 0, y \geq 0$

D $x+y \geq 7, 2x-3y+6 \leq 0, x \geq 0, y \geq 0$



$\frac{x}{-3}+\frac{y}{2}=1$

$2x-3y=-6$

$2x-3y \geq -6$

$0-0 \geq -6$

True

$\frac{x}{7}+\frac{y}{7}=1$

$x+y \leq 7$

1. Intercept form
2. Feasible region
3. Point of Intersection of 2 lines
4. Corner Points

Question

Minimize $z = 18x + 10y$ subject to $4x + y \geq 20, 2x + 3y \geq 30, x, y \geq 0$ [2020]

→ conditions or constraints

$\frac{x}{5} + \frac{y}{20} = 1$ | $\frac{x}{15} + \frac{y}{10} = 1$

$4x + y = 20$

$4x + 6y = 60$

$-5y = -40$

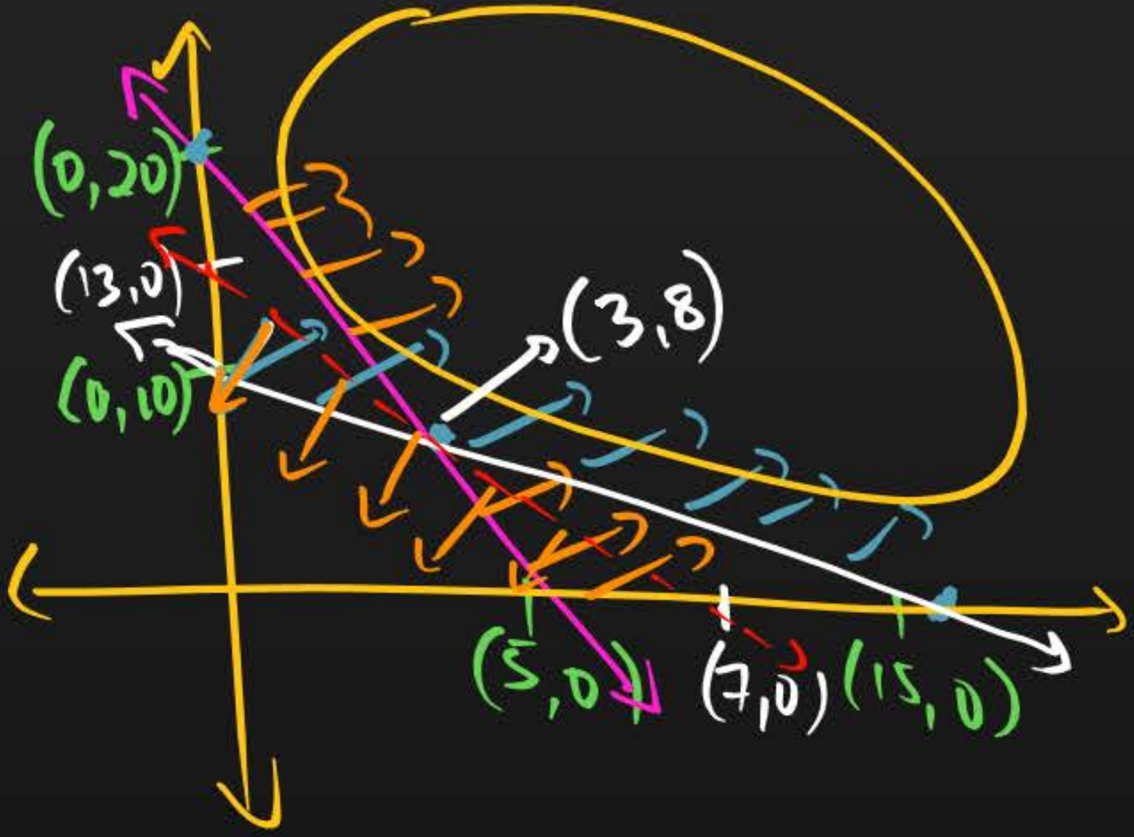
$y = 8$

$\Downarrow$

$4x + 8 = 20$

$4x = 12$

$x = 3$

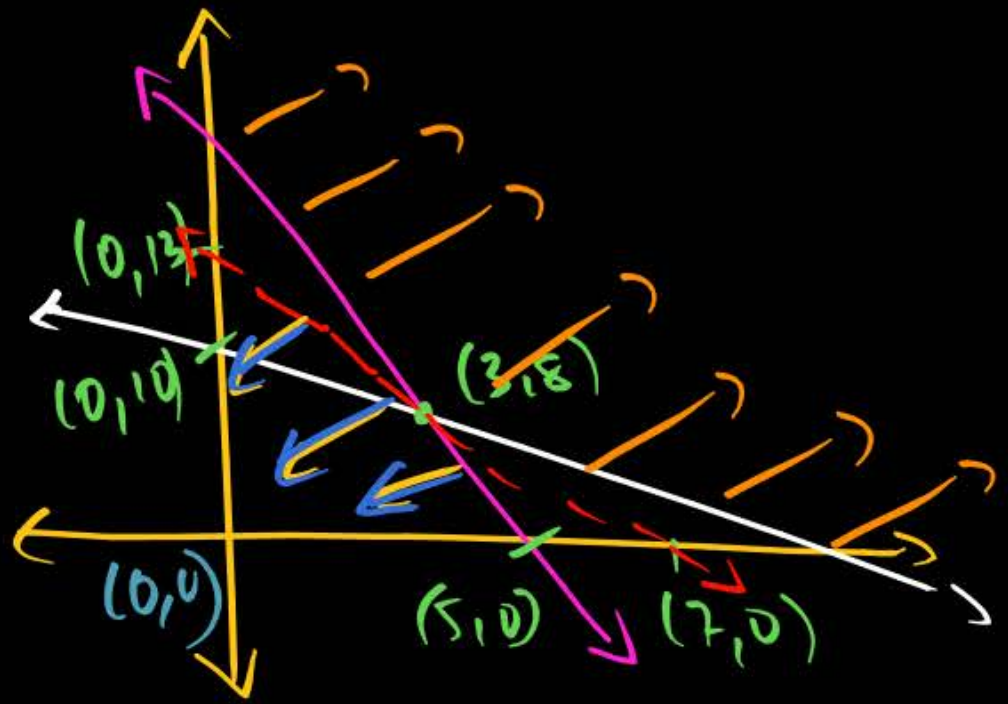


A 431

B 143

C 314

D 134



$z = 18x + 10y$

At (3,8) we got $z = 134$

$\Downarrow$

$18x + 10y < 134$ → min

$\frac{x}{7} + \frac{y}{13} = 1$ → Approximately

Put $x = 0, y = 0$

$0 < 134$

True

	$18x+10y$
$(3,8)$	$54+80=134 \rightarrow$ min
$(0,20)$	200
$(15,0)$	270

$18x+10y < 134$

$$\frac{x}{7\cdots}+\frac{y}{13\cdots}=1$$

$(0,0) \Rightarrow 0 < 134$

True

Question

$$x+y=3$$
$$-x+y=1$$
$$2y=4$$
$$y=2$$
$$x=1$$

The minimum value of $z=3x+5y$ subject to $x+y\le 3, -x+y\le 1, x, y\ge 0$ is [2021]

$\to$ (1) $\quad\to$ (2) $\quad\to$ 1st Quad

$\frac{x}{3}+\frac{y}{3}\le 1$ | $\frac{x}{-1}+\frac{y}{1}\le 1$

$0+0\le 3$

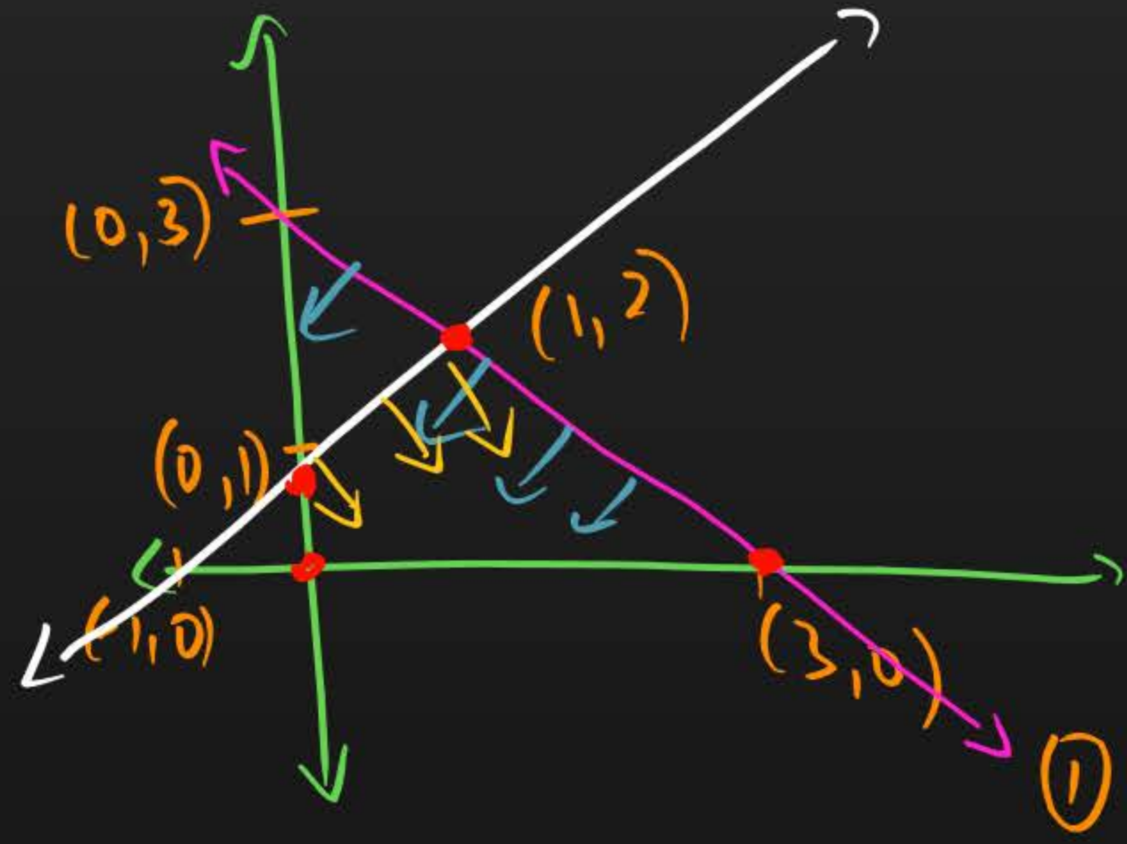
$0+0\le 1$

(A) 9

(B) 11

(C) 0

(D) 15



	$z=3x+5y$
(0,0)	0 $\to$ min
(0,1)	5
(3,0)	9
(1,2)	$3+10=13$ $\to$ max

Question

$$\begin{aligned} 2x+4y&=36 \\ 2x+3y&=34 \\ \hline y&=2 \end{aligned}$$

$x+y=18$

$x=14$

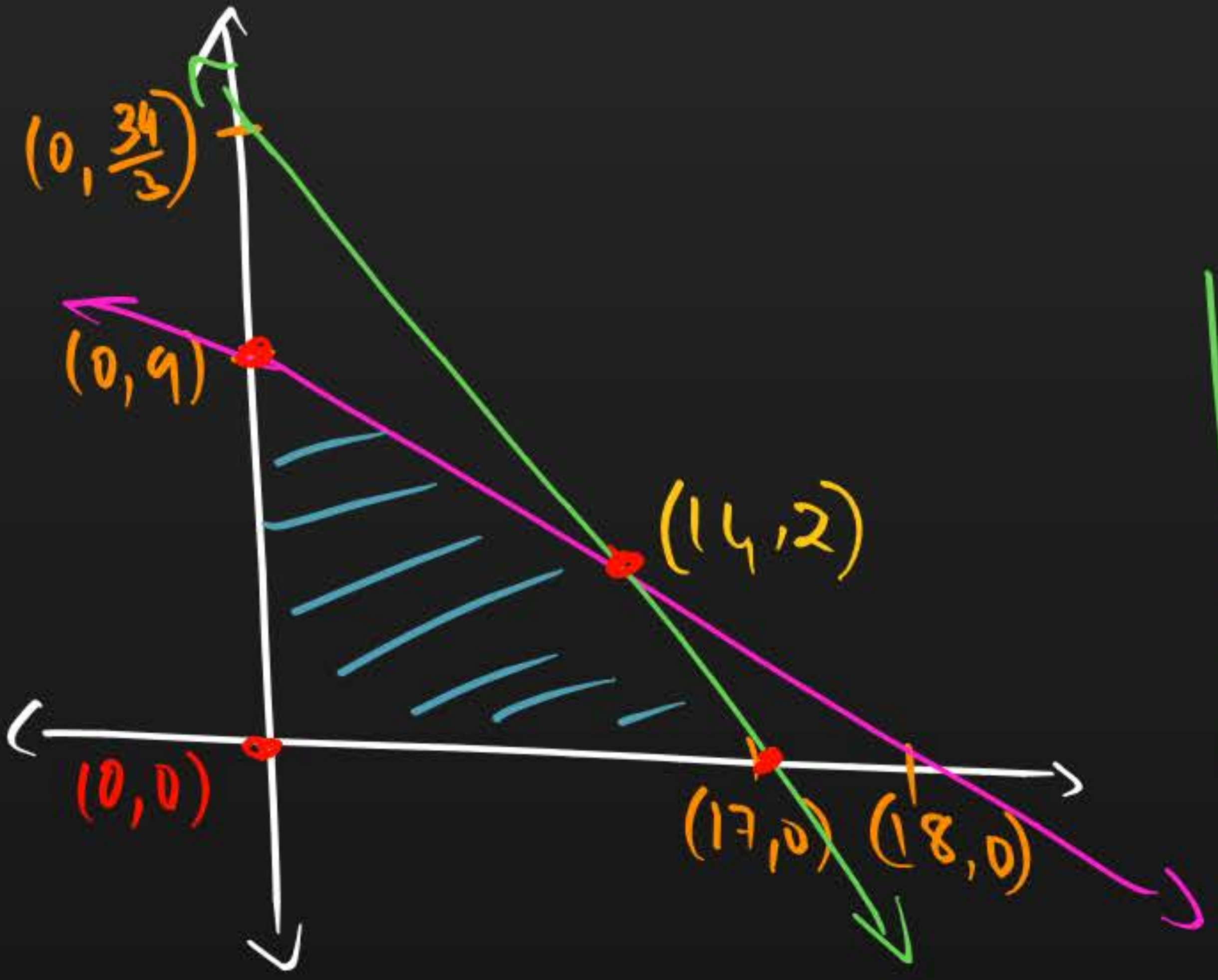
The maximum value of $z = 30x + 50y$ subject to $x + 2y \leq 18, 2x + 3y \leq 34$, $x, y \geq 0$ is [2021]

(A) 450

(B) 510

(C) 520

(D) 560



$\frac{x}{18} + \frac{y}{9} = 1$

$\frac{x}{17} + \frac{y}{11.\ldots} = 1$

	$z = 30x + 50y$
(0,0)	0
(17,0)	510
(14,2)	420+100=520
(0,9)	450

Question

The maximum value of $z = 3x + 4y$, subject to the constraints $x + y \leq 40, x + 2y \leq 60$ and $x, y \geq 0$ is

(A) 130

(B) 120

(C) 140

(D) 40

Question

Minimize $z = 18x + 10y$ subject to $4x + y \geq 20, 2x + 3y \geq 30, x, y \geq 0$ [2020]

(A) 431

(B) 143

(C) 314

(D) 134

Question

$z = 3x+4y$ | $x - y = -1$, $\frac{x}{-1}+\frac{y}{1}=0$ | $-x+y=0$, $x=y \Rightarrow (0,0)$

$Ax+By+C=0$

Slope $= \boxed{m=-\frac{A}{B}}$

Maximize $z = 3x_1 + 4x_2$, if possible, Subject to the constraints $x_1 - x_2 \le -1, -x_1 + x_2 \le 0; x_1, x_2 \ge 0.$

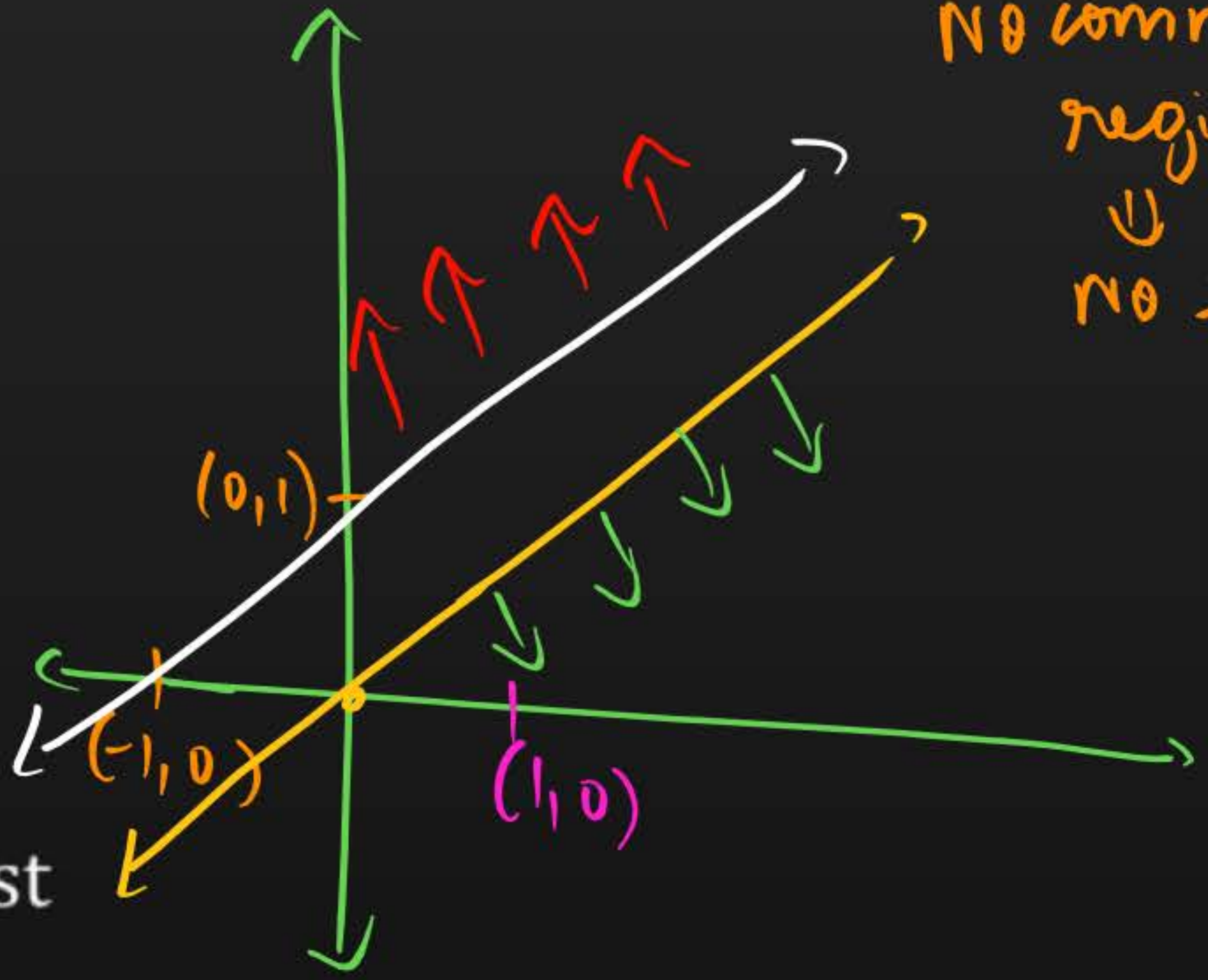
[2019]

$x-y+1=0$ | $-x+y=0$

$m_1 = \frac{-1}{-1} = 1$ | $m_2 = \frac{-(-1)}{1} = 1$

$m_1 = m_2$

No common region
⇓
no solution



A 105

B 100

C 156

D Does not exist

Put $(x,y)=(1,0)$

$x_1 - x_2 \le -1$	$-x_1 + x_2 \le 0$
$0 - 0 \le -1$	$-1 + 0 \le 0$
$0 \le -1$	$-1 \le 0$
False	True

Question

$z = 7x - 3y$

$x + 2y \le 2$ | $2x + 4y \ge 8$

Maximize $z = 7x_1 - 3x_2$. Subject to, $x_1 + 2x_2 \le 2, 2x_1 + 4x_2 \ge 8, x_1 \ge 0, x_2 \ge 0$.

$\frac{x}{2} + \frac{y}{1} = 1$ | $\frac{x}{4} + \frac{y}{2} = 1$

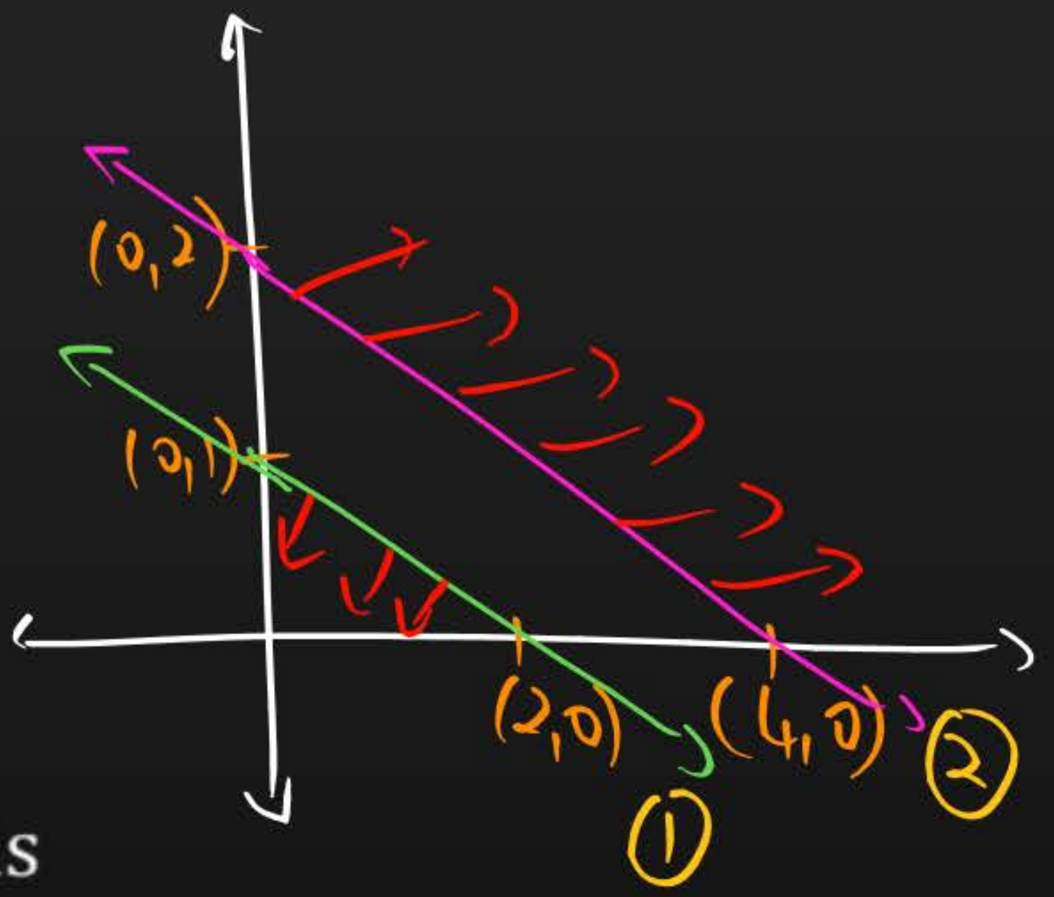
[2019]

A Unique solution

B Unbounded solution

C Infeasible solution

D Infinite number of solutions



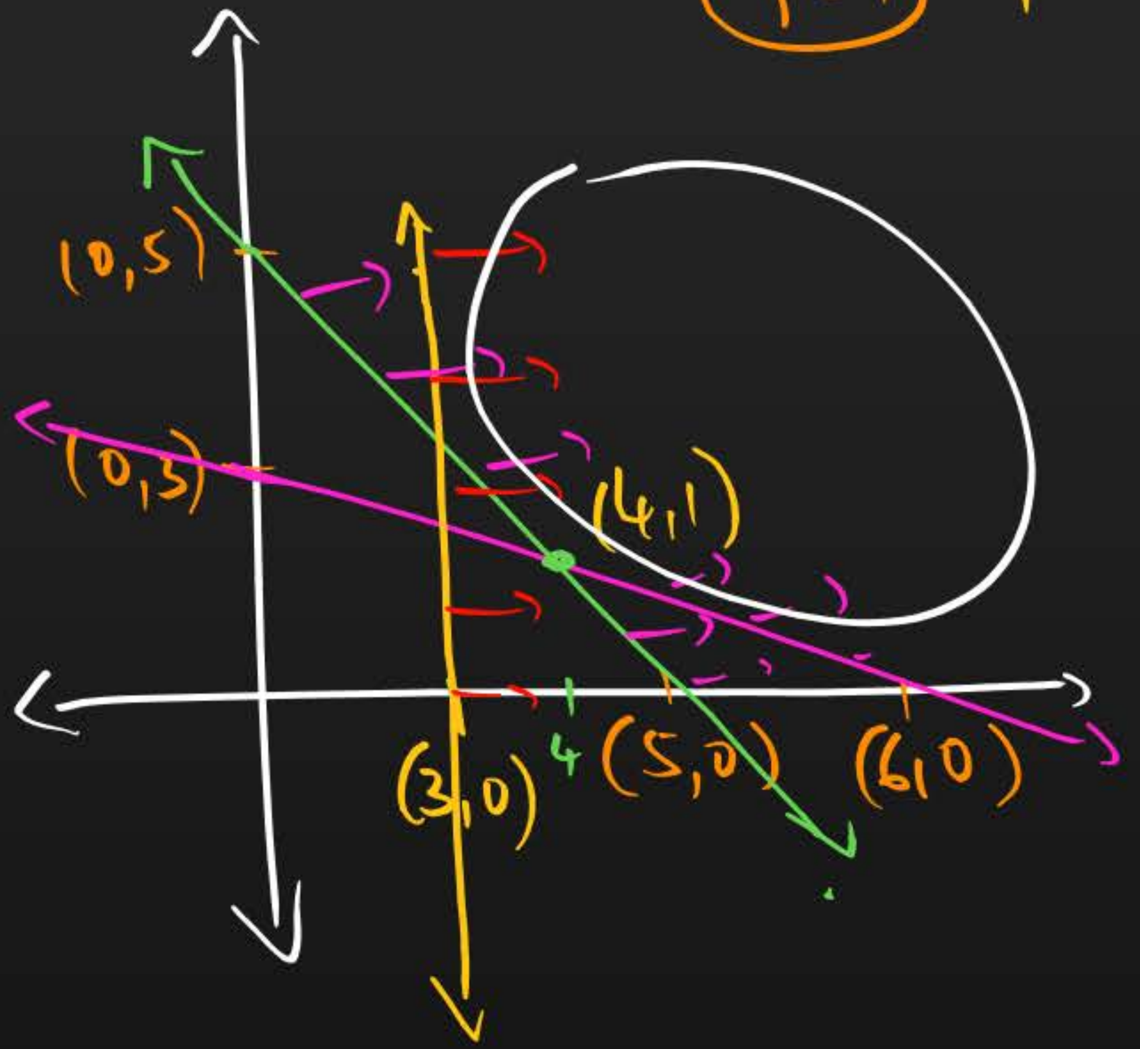
Question

Maximize $z = -x + 2y$ subject to the constraints
$x \geq 3, x + y \geq 5, x + 2y \geq 6, y \geq 0$

$\frac{x}{5} + \frac{y}{5} = 1$ | $\frac{x}{6} + \frac{y}{3} = 1$

$x + y = 5$
$x + 2y = 6$
$-y = -1$
$y = 1$

$x + 1 = 5$
$x = 4$



A Unique solution

B Infinite number of optimal solutions

C Infeasible solution

D Unbounded solution

Question

Maximize $z = 3x_1 + 4x_2$, if possible, Subject to the constraints $x_1 - x_2 \leq -1, -x_1 + x_2 \leq 0; x_1, x_2 \geq 0.$

A 105

B 100

C 156

D Does not exist

Question

$Z = 6x_1 + 2x_2$, subject to $5x_1 + 9x_2 \leq 90, x_1 + x_2 \geq 4,\ x_2 \leq 8, x_1 \geq 0, x_2 \geq 0$. The minimum value of Z occurs at [2023]

A $(18, 0)$

B $(3.6, 8)$

C $(0, 4)$

D $(4, 0)$

Question

The maximum value of $z = 3x + 5y$ subject to $x + 2y \leq 20, x + y \leq 15$, $y \leq 5, x, y \geq 0$ is [2021]

(A) 25

(B) 45

(C) 55

(D) 65

Question

The objective function $Z = 4x + 3y$ can be minimum subjected to the constraints $3x + 4y \leq 24, 8x + 6y \leq 48, x \leq 5, y \leq 6; x, y \geq 0$ [2024]

A at only one point

B at two points only

C at an infinite number of points

D none of these

Thank You