L.P.#

Q: Max $Z = -x + 2y$

Subject To :- $x \geq 3$ — (1)

Sol^n: $x + y \geq 5$ — (2) ; $x + 2y \geq 6$ — (3)

$y \geq 0$ — (4)

From (1) :-

	A	B
x	0	5
y	5	0

→ at (0,0)

$0 \geq 5$ → False

∴ area away from (0,0)

From (3) :-

	C	D
x	0	6
y	3	0

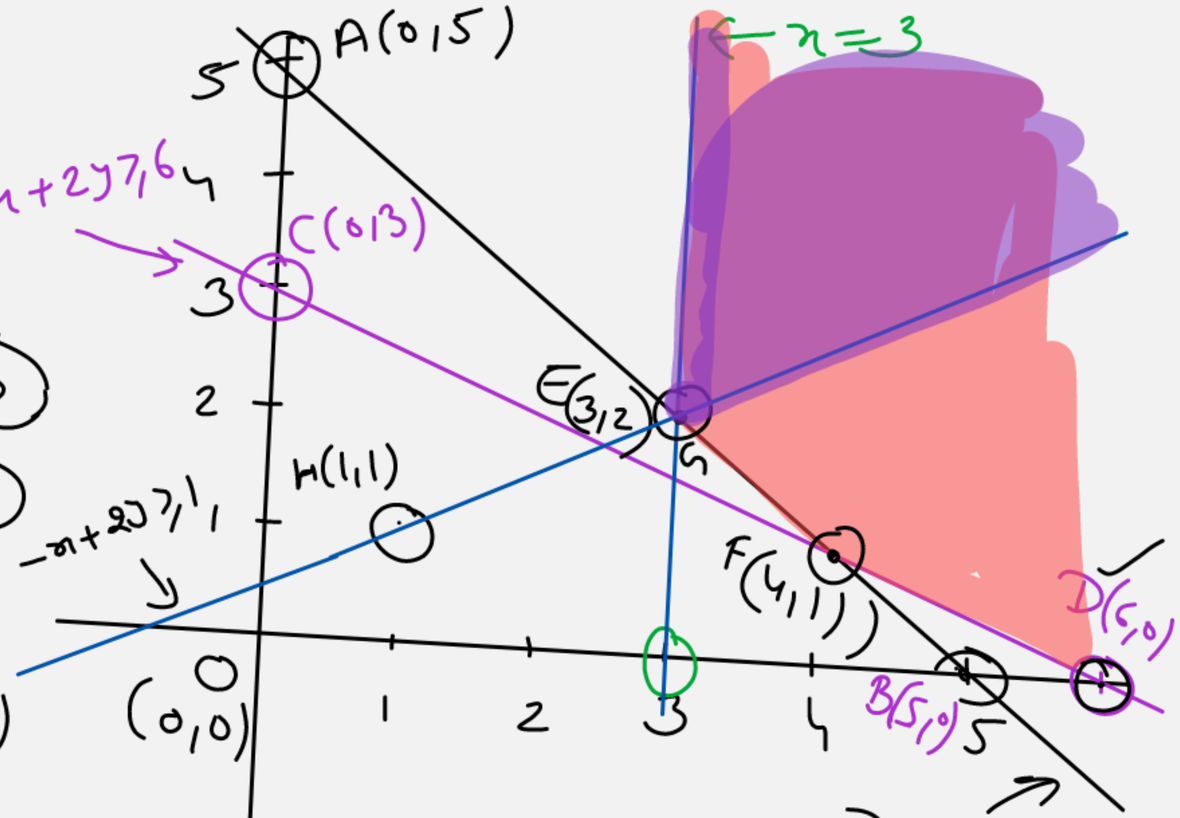
→ at (0,0)

$0 \geq 6$ → False

∴ area away from (0,0)

∵ Here the region is unbounded =>

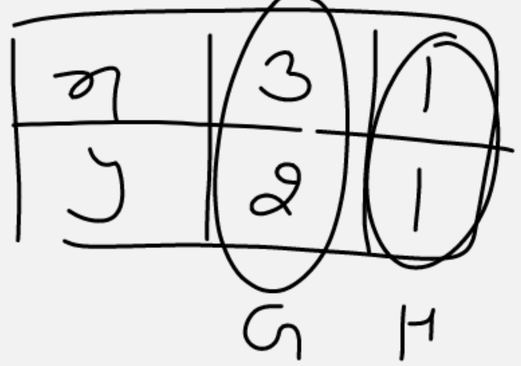
∵ $Z = (-x + 2y) \geq 1$ → Draw graph



Point	Z
F(3,2)	$Z = -3 + 2(2) = 1$
F(4,1)	$Z = -4 + 2(1) = -2$
D(6,0)	$Z = -6 + 0 = -6$

→ maximum value

$\Rightarrow -x + 2y \geq 1$



→ at (0,0)

$0 \geq 1$ → False

∴ area away from (0,0)

→ Here the line $-x + 2y \geq 1$ has the common area with the unbounded region.

∴ There is no max. value of Z.

Q. $Z = 3x + 5y$ → minimise

→ $x + 3y \geq 3$ — ① $x, y \geq 0$ — ③

$x + y \geq 2$ — ②

Sol:-

form ① :-

x	0	3
y	1	0
	A	B

→ at (0,0)

$0 \geq 3$ → False

→ ∴ area away from (0,0)

→ form ② :-

	C	D
x	0	2
y	2	0

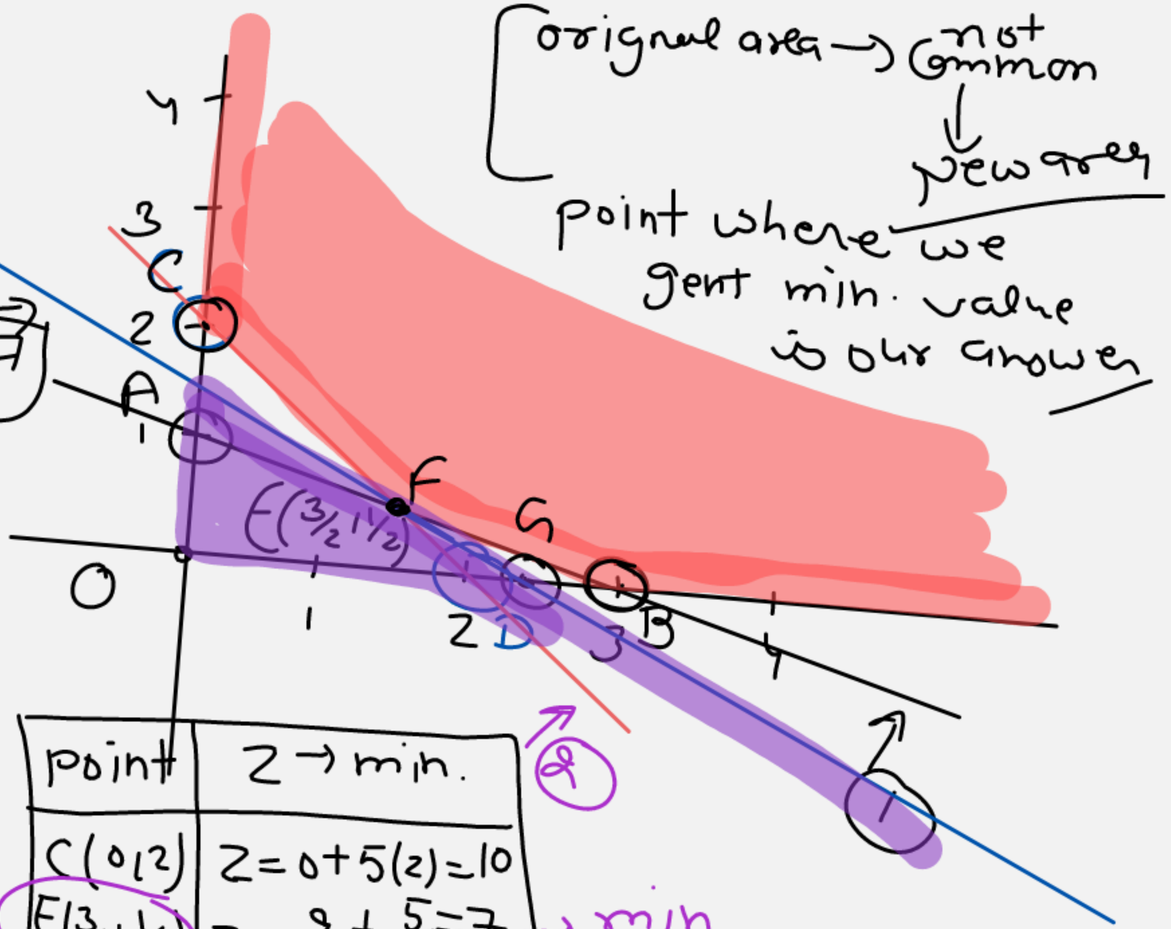
→ at (0,0) → $0 \geq 2$ → false

∴ area away from (0,0)

original area → not common → new area

point where we get min. value is our answer

$3x + 5y \leq 7$



⇒

point	$Z \rightarrow$ min.
C(0,2)	$Z = 0 + 5(2) = 10$
E(3/2, 1/2)	$Z = \frac{3}{2} + \frac{5}{2} = 7$ → min.
B(3,0)	$Z = 3 + 0 = 3$

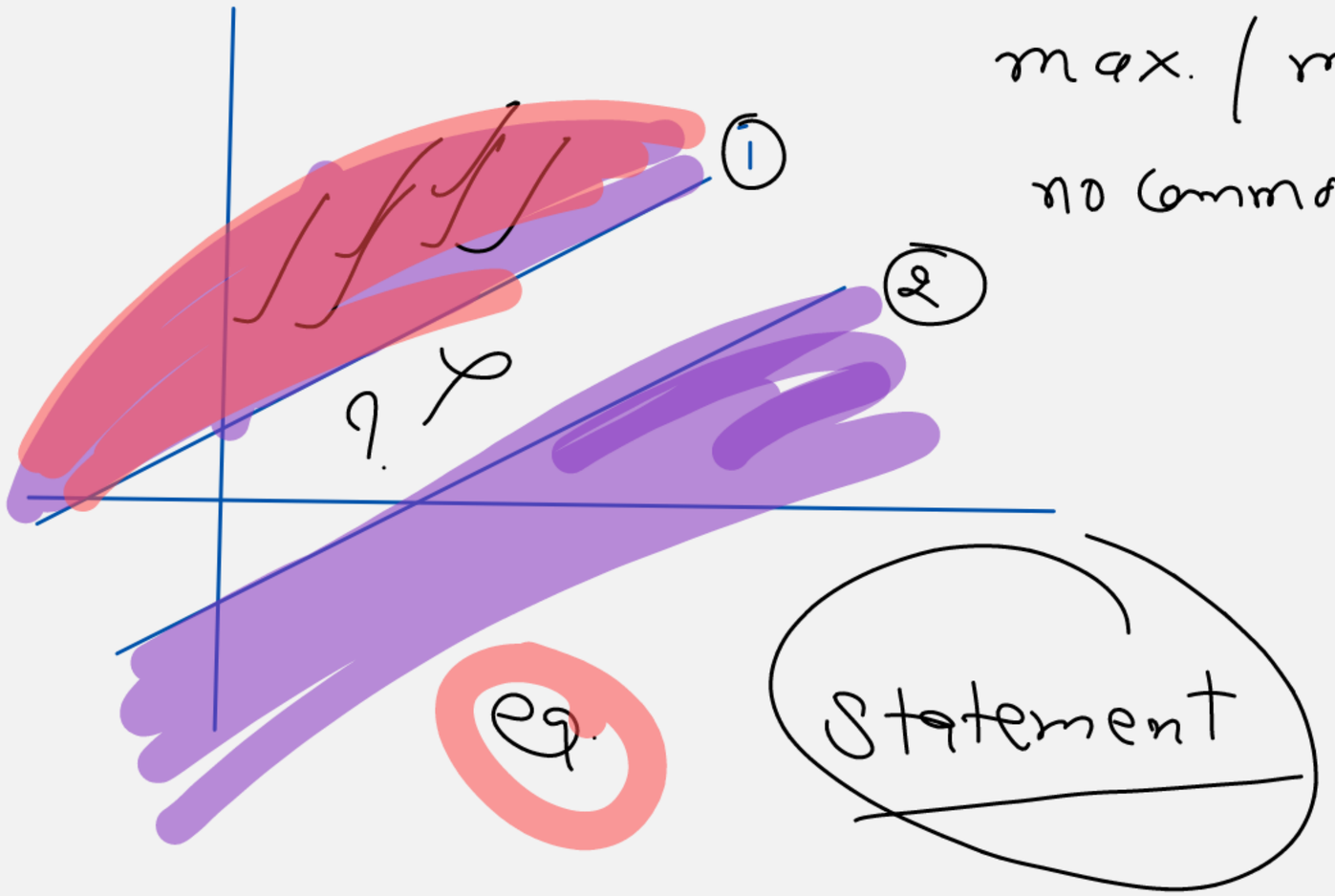
∴ the area is unbounded Here F & G

$Z = 3x + 5y \leq 7$ →

	F	G
x	3/2	7/3
y	1/2	0

→ at (0,0); $0 \leq 7$ → True → area towards the (0,0)

So Here Z has min. value at $(\frac{3}{2}, \frac{1}{2})$ is 7



max. / min

no common area

Reshma wishes to mix two types of food P and Q in such a way that the vitamin contents of the mixture contain at least 8 units of vitamin A and 11 units of vitamin B. Food P costs Rs 60/kg and Food Q costs Rs 80/kg. Food P contains 3 units/kg of Vitamin A and 5 units / kg of Vitamin B while food Q contains 4 units/kg of Vitamin A and 2 units/kg of vitamin B. Determine the minimum cost of the mixture.

→ Let Quantity of food P is x kg & Q is y kg.

∴ the Cost of Mix. of P & Q $= 60x + 80y = Z \rightarrow$ min.

#

	Vit A	Vit B
P($x$kg)	3	5
Q($y$kg)	4	2
P+Q	8 unit/kg	11 unit/kg.

Now

$3x + 4y \geq 8 \rightarrow$ for Vit. A — (1)

$5x + 2y \geq 11 \rightarrow$ for vit B — (2)

& $x, y \geq 0$ — (3)