If $y = 0$

$2x + 3(0) = 12$

$2x + 0 = 12$

$x = 12/2$

$x = 6 \quad (6, 0)$

For Constraint on Raw materials

$x + 2y \leq 8 \quad (x + 2y = 8)$

If $x = 0$

$0 + 2y = 8$

$2y = 8$

$y = 8/2$

$y = 4 \quad (0, 4)$

If $y = 0$

$x + 2y = 8$

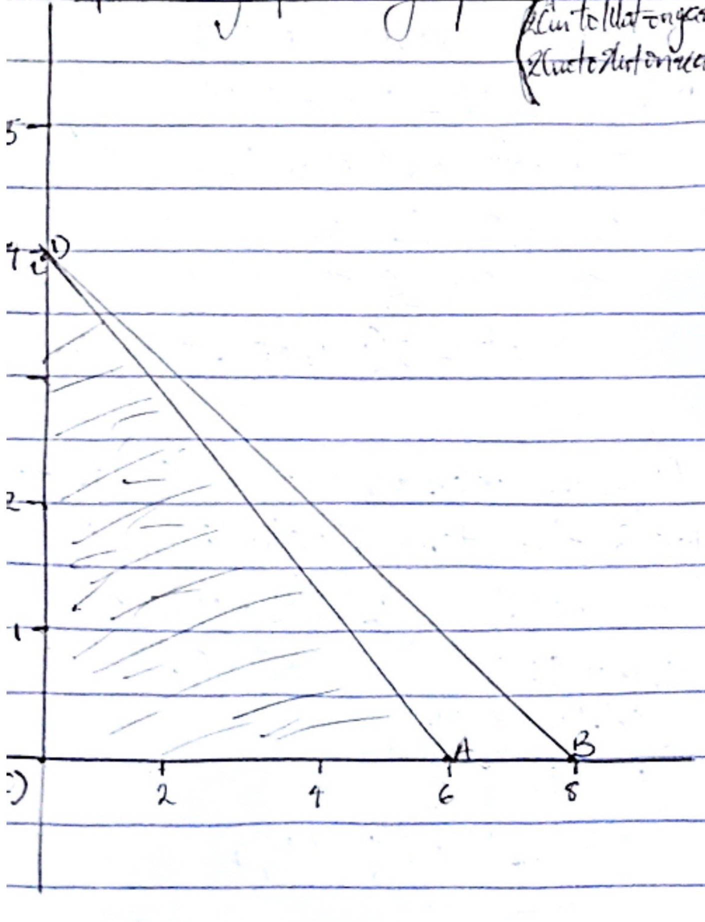
$x + 2(0) = 8$

$x + 0 = 8$

$x = 8 \quad (8, 0)$

plotting of the graph

(2cm to 1 unit on y axis
2cm to 1 unit on x axis)



Extreme points

A = (6, 0)

B = (8, 0)

C = (0, 4)

D = (0, 4)

O = (0, 0)

Finding the feasible Region

$2x + 3y \leq 12 \; \ldots \; (1)$

$x + 2y \leq 8 \; \ldots \; (2)$

(Given the Structural Constraint on Machine time and Raw materials)

If x and $y = 0$ for eqn 1

$2(0) + 3(0) \leq 12$

$0 \leq 12$

If x and $y = 0$ for eqn 2

$(0) + 2(0) \leq 8$

$0 \leq 8$

$\therefore \; 0 \leq 12$

$0 \leq 8$

(we can only find the feasible region, since there is no point of intersection)

Finding the Optimal Solution

EXTREME POINT	COORDINATE	Z = 3x + 4y (OBJECTIVE FUNCTION)
O	(0,0)	$Z = 3(0) + 4(0)$ $= 0$
A	(6,0)	$Z = 3(6) + 4(0)$ $= 18 + 0$ $= 18$
B	(8,0)	$Z = 3(8) + 4(0)$ $= 24 + 0$ $= 24$ //

OBJECTIVE FUNCTION

...mize $Z = 2x + 5y$

Subject to Constraints:

$x + 2y \geq 6$

$2x + y \geq 5$

$x, y \geq 0$ (NON NEGATIVITY CONSTRAINT)

...entation on Graph (Calculation)

...ding extreme points)

Constraint on hours of labor

$(x + 2y \geq 6) \Rightarrow x + 2y = 6$

$= 0$

$+ 2y = 6$

$y = 6/2$

$y = 3$ (0, 3)

$= 0$

$2(0) = 6$

$0 = 6$

$= 6$ (6, 0)

...raints on unit of material

$(2x + y \geq 5) \Rightarrow 2x + y = 5$

0

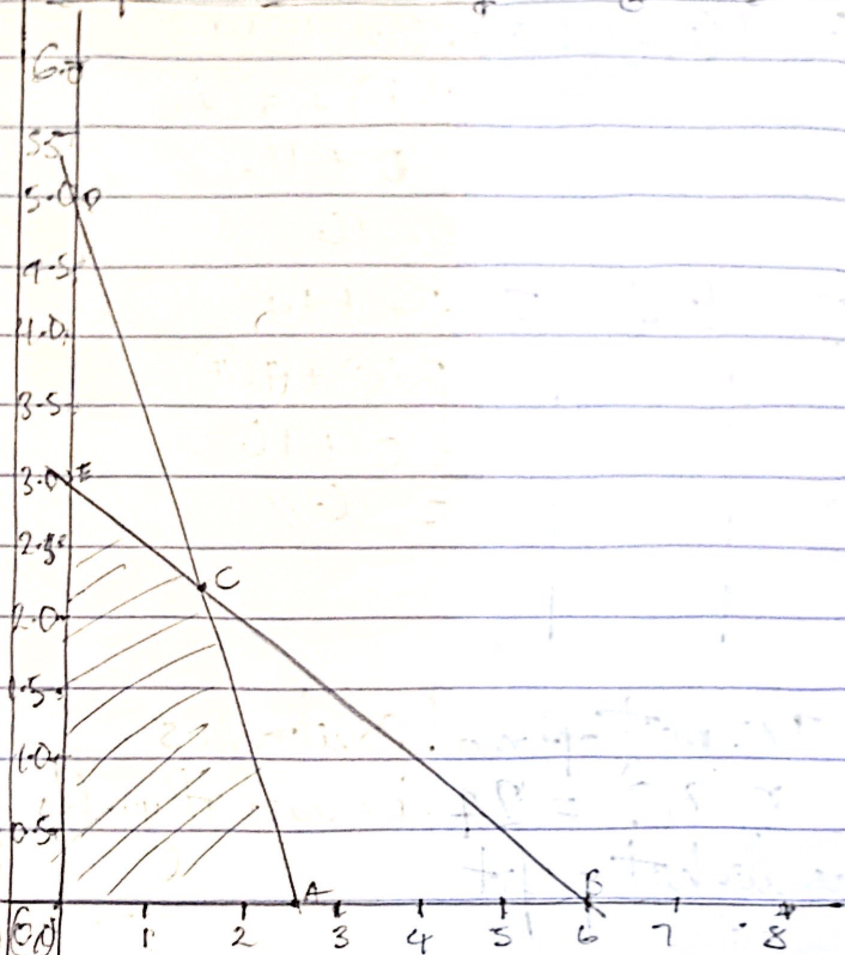
$= 5$

$- 5$ (0, 5)

$) = 5$

(1cm to 0.5 units y axis
1cm to 1 unit on x axis)

Representation on Graph (Construction)



Extreme points

A = (2.5, 0)

B = (6.0, 0)

C = (?) now [1.33, 2.35)

D = (0, 5.0)

E = (0, 3.0)

O = (0, 0)

Finding the Feasible region

$x + 2y \geq 6$ (for Constraint on hours of la...

If y and $x = 0$

=20

$x + 2(0) = 18$

$x + 0 = 18$

$x = 18 - (18, 0)$

)

)

materials

$2y = 30)$

$0, 15)$

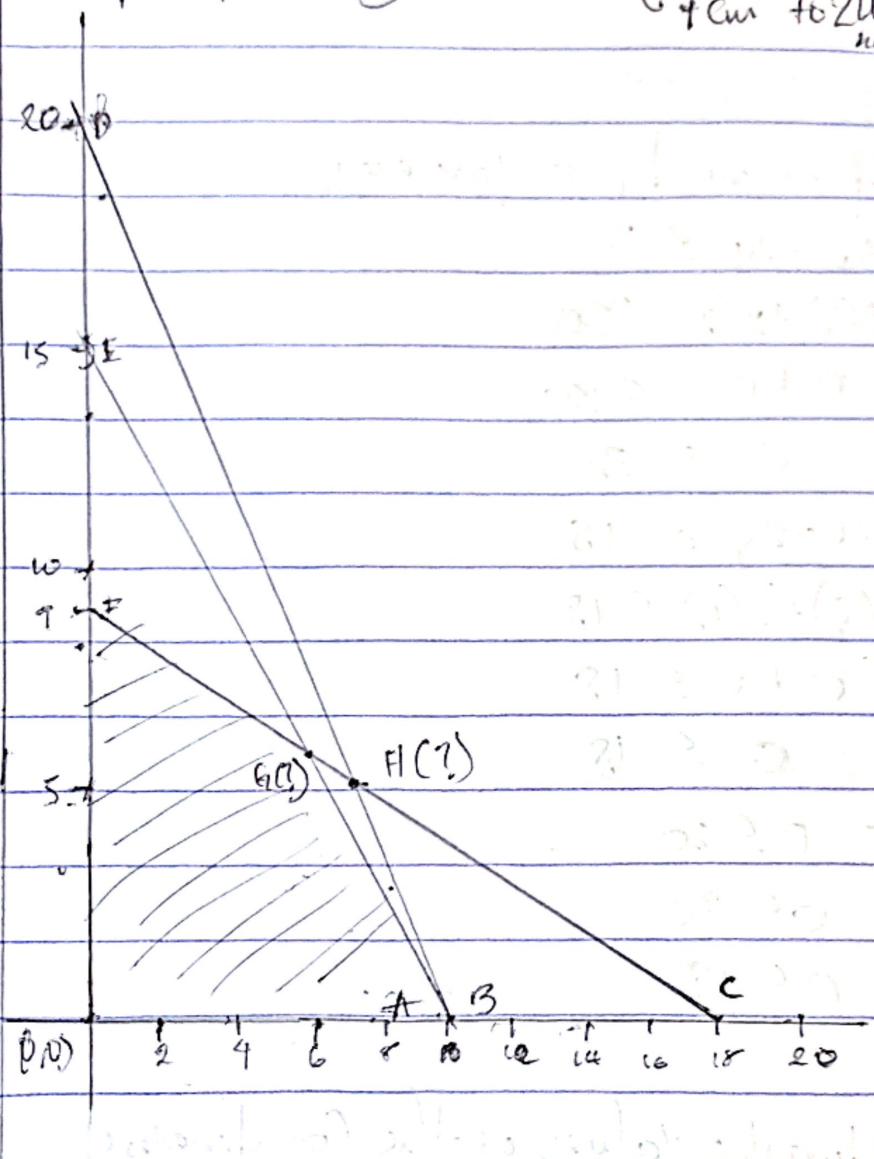
0)

s on machine

$x + 2y = 18)$

Graph plotting

Scale
(2.5 cm to 5 units y-axis
4 cm to 2 units x-axis)



Extreme points

$A = (10, 0)$

$B = (10, 0)$

$C = (18, 0)$

$D = (0, 20)$

$E = (0, 15)$

$F = (0, 9)$

$G = (?)$

$H = (?)$

$\to x$

$\to 2y$

lable cannot exceed

$y \leq 15$

CTION

$7x+5y$

Constraints

≤ 20

≤ 15

$= 0$

Graph (Calculation)

Advertisement Budget:

$\Rightarrow x+2y=20$

$(0, 10)$

$(20, 0)$

n production capacity

$\Rightarrow x+2y=15$

S

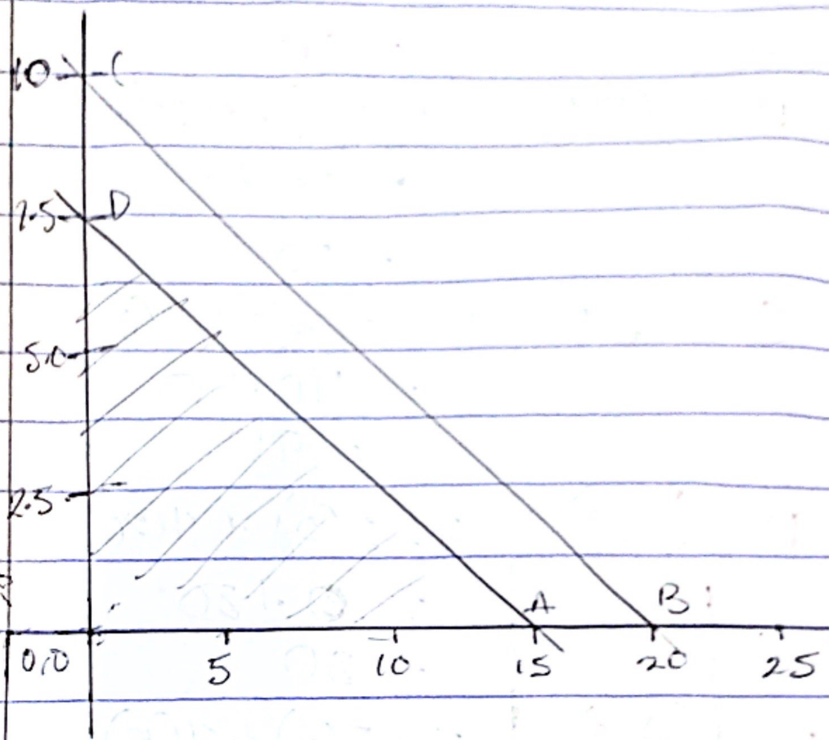
$x+2(0)=15$

$x+0=15$

$x=15 \quad (15,0)$

Graph Plotting

scale
2cm to 2.5 units ...
2cm to 5 units on ...



Extreme points

$O = (0,0)$

$A = (15,0)$

$B = (20,0)$

$C = (0,10)$

$D = (0,7.5)$

Finding the Feasible Region

$x+2y \leq 20$ ———— ①

$x+2y \leq 15$ ———— ②

(Given the structural constraint of production capacity and Advertisement Budget)

…ant

…on NEGATIVITY
(CONSTRAINT)

…ds (Calculation)
labor hours
$3x+4y=12$

$(0,3)$

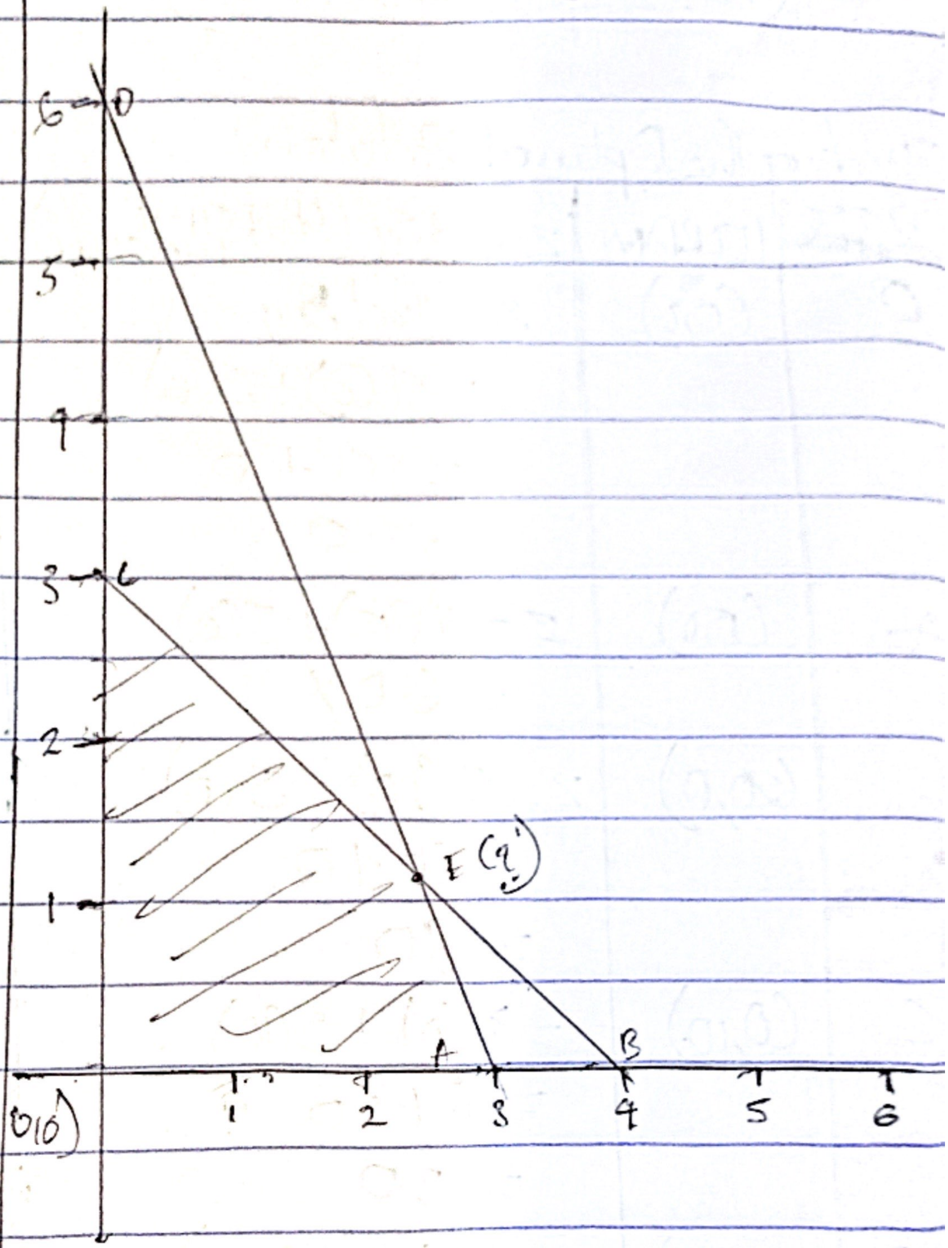
)

…otal Investment
$(x+y=6)$

$(0,6)$

Graph Construction

Scale
(2cm to 1 unit on y-axis
2cm to 1 unit on x-axis)



Extreme points

$O = (0,0)$

$A = (3,0)$

$B = (4,0)$

$C = (0,3)$

$D = (0,6)$

$E = (?,?)$

...ed 12 Unit

EGATIVITY CONSTRAINT

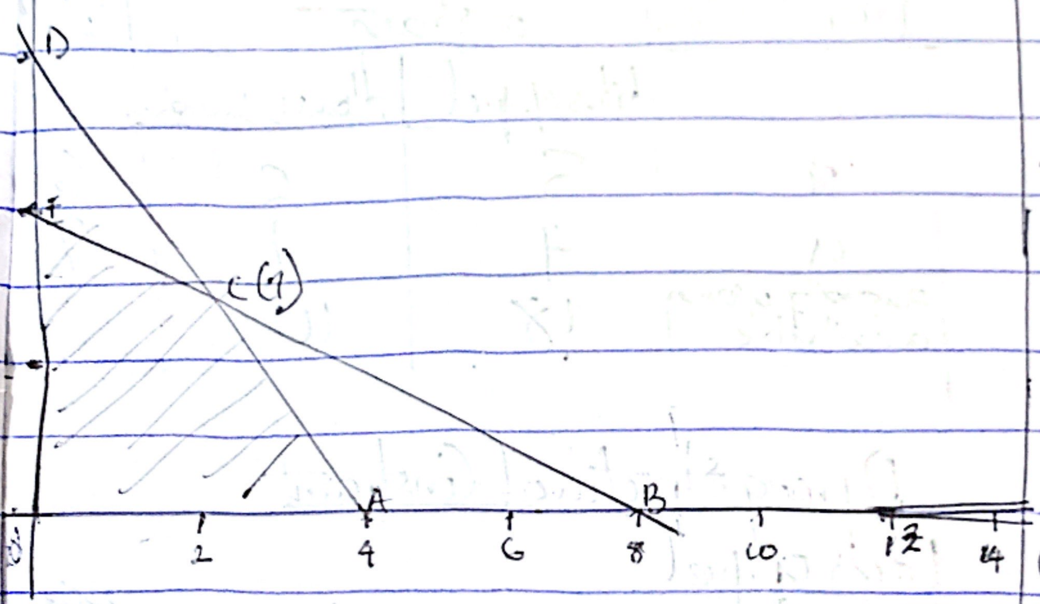
(calculation)

...ing time

$x = 4 \quad (4,0)$

plotting of Graph

scale (2cm to 2 Units y axis, 2cm to 2 Units x axis)



Extreme points

$A = (4,0)$

$B = (8,0)$

$C = (?)$

$D = (0,6)$

$E = (0,4)$

$O = (0,0)$

Finding the Feasible Region

for Unit

If x

3(0)

0 +

So

Finding ... of (C?) x

3x+2y

x+2y

(i) eqn

3x

x

2x

x

x

sub x =

x+2

(4)+

2y =

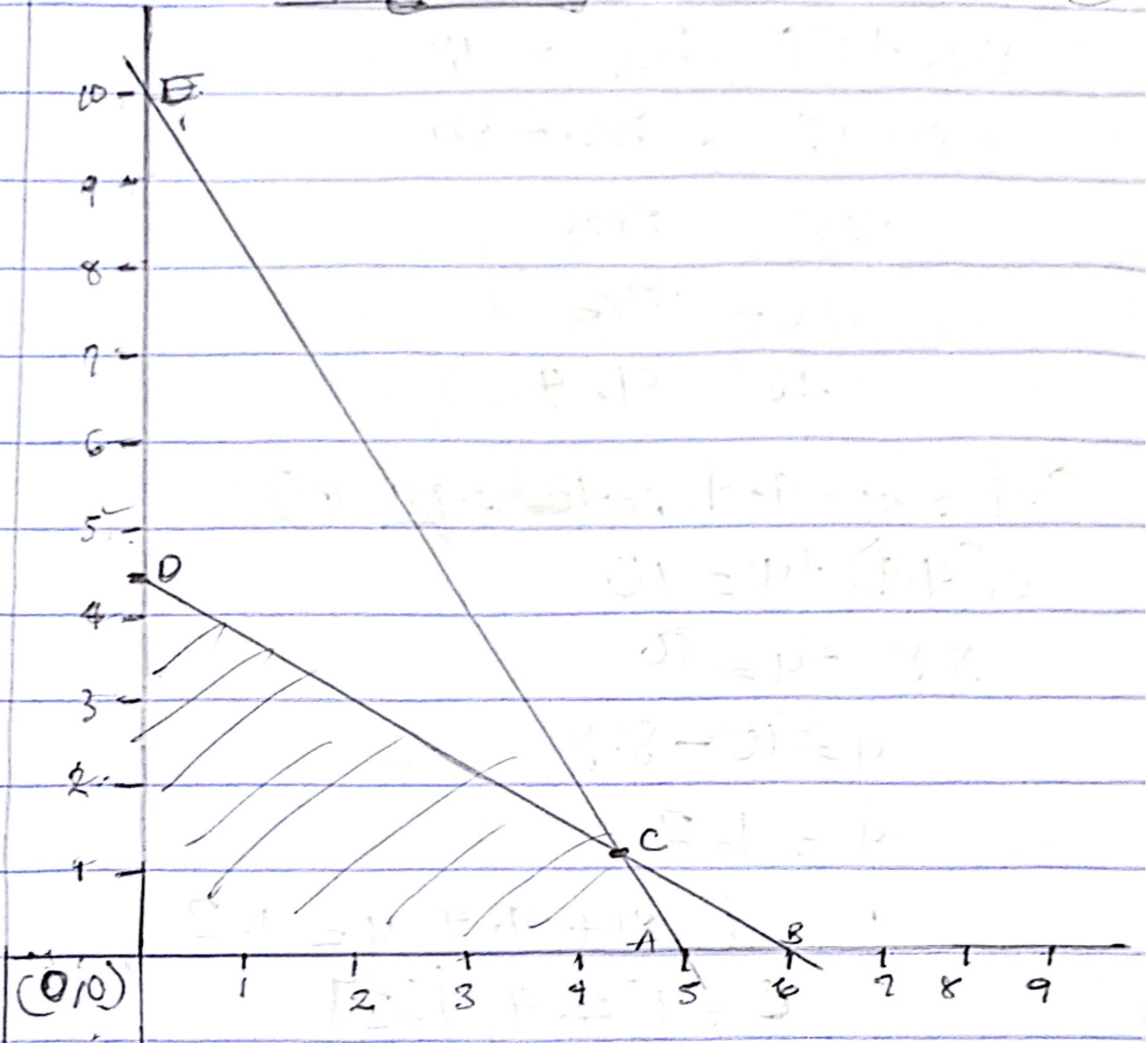
2y =

∴ 07/18

07/10.

Scale
(1cm to 1 unit on y axis)
(2cm to 1 unit on x axis)

Graph Plotting



A=(5,0), B=(6,0), C=(?,?), D=(0,4.5)

E=(0,10) O=(0,0)

Scale (1cm to 1unit on y-axis
1cm to 1unit on x-axis)

_ raw materials

(0,9)

=18

18

(18,0)

n Machinetime

24)

24

24

24

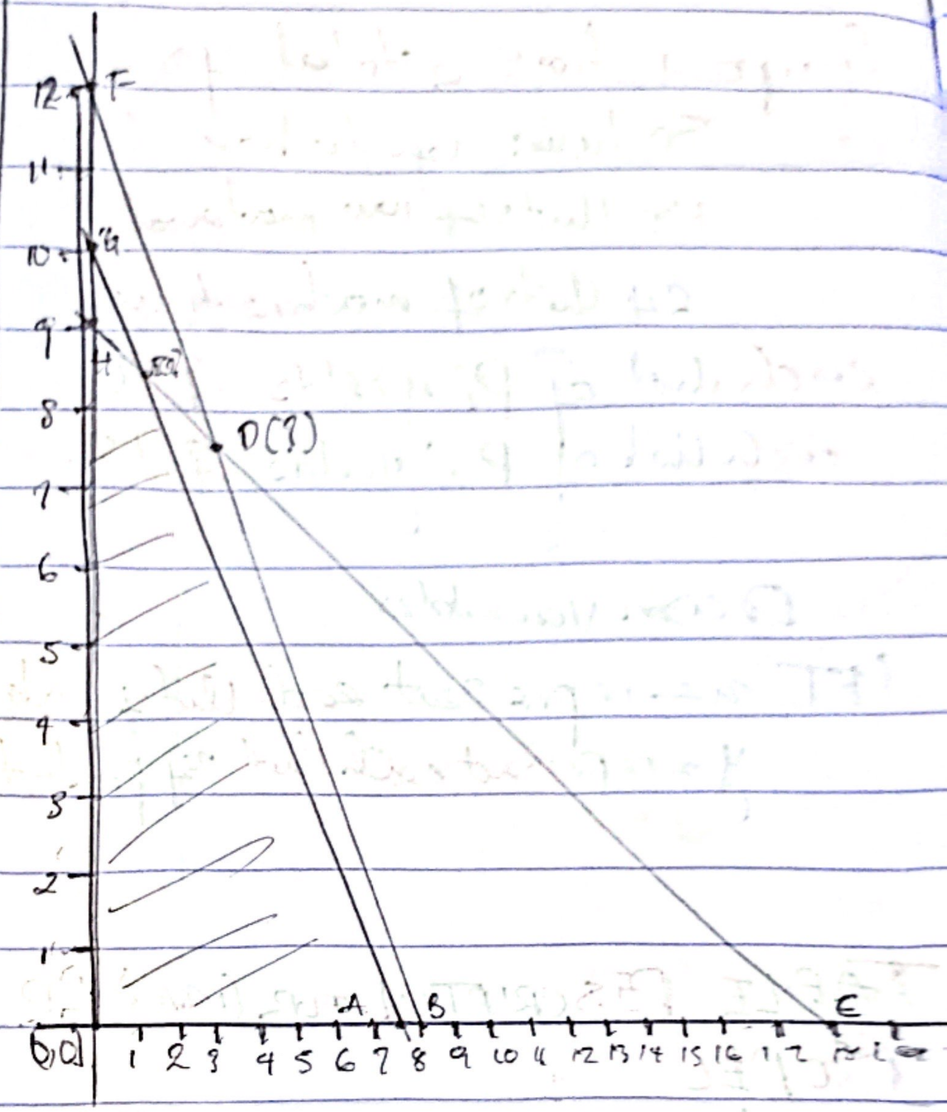
/12

2 (0,12)

=24

=24

/3



Extreme Points

A = (7.5, 0)

B = (8, 0)

C = (18, 0)

D = (?)

E = (?)

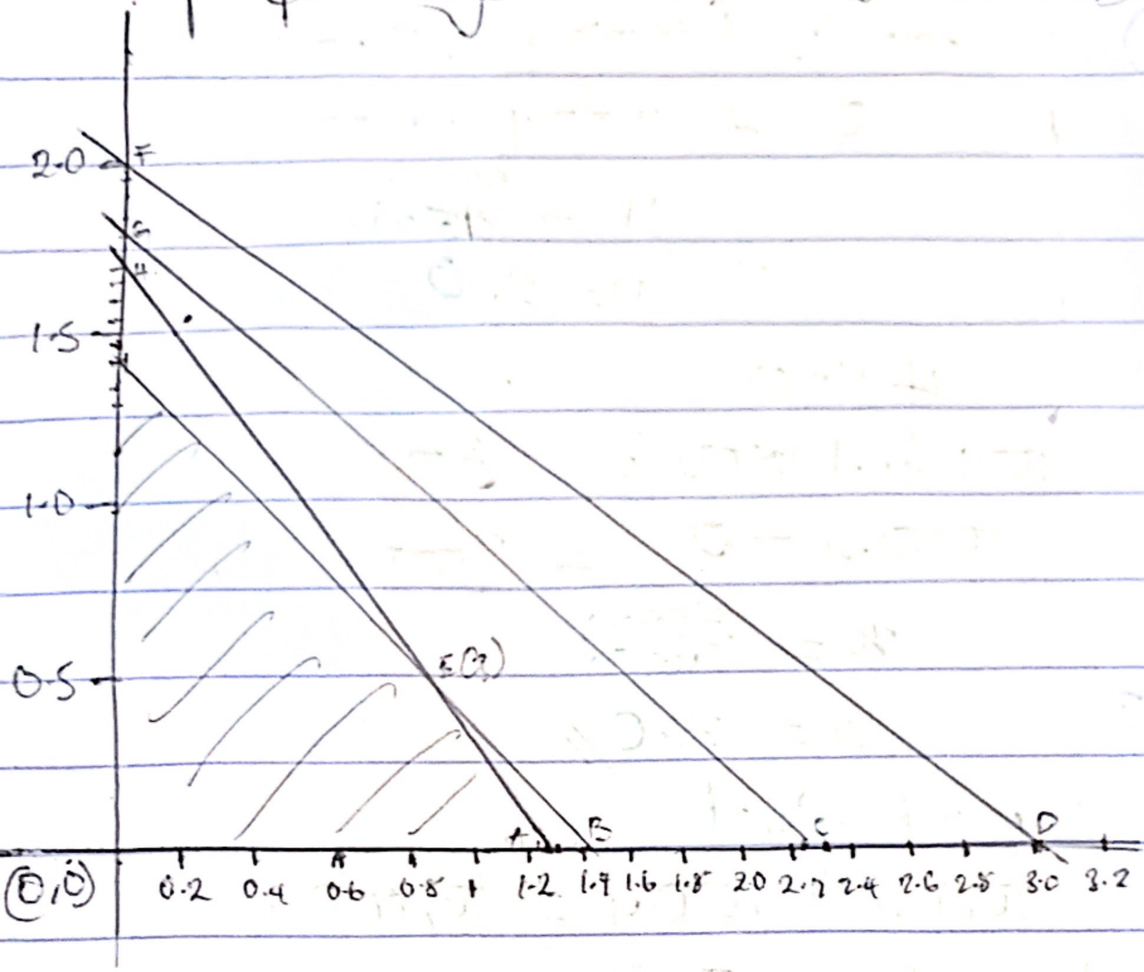
F = (0, 12)

G = (0, 10)

H = (0, 9)

O = (0, 0)

Graph plotting   Scale (2cm to 0.5 units, 1cm to 0.2 units)



Extreme points

A = (1.25, 0)

B = (1.4, 0)

C = (2.25, 0)

D = (3.0, 0)

I = (?) = (0.71, 0.72)

If x and y = 0

4000(0) + 3000(

0 ≤

2000(0) + 250

0

1000(0) + 150

0 ≤ 5

0 ≤ 4

0 ≤ 3

Finding the va

of I(?) using

using the ~~line~~

that form the

2000x + 2

4000x + 3

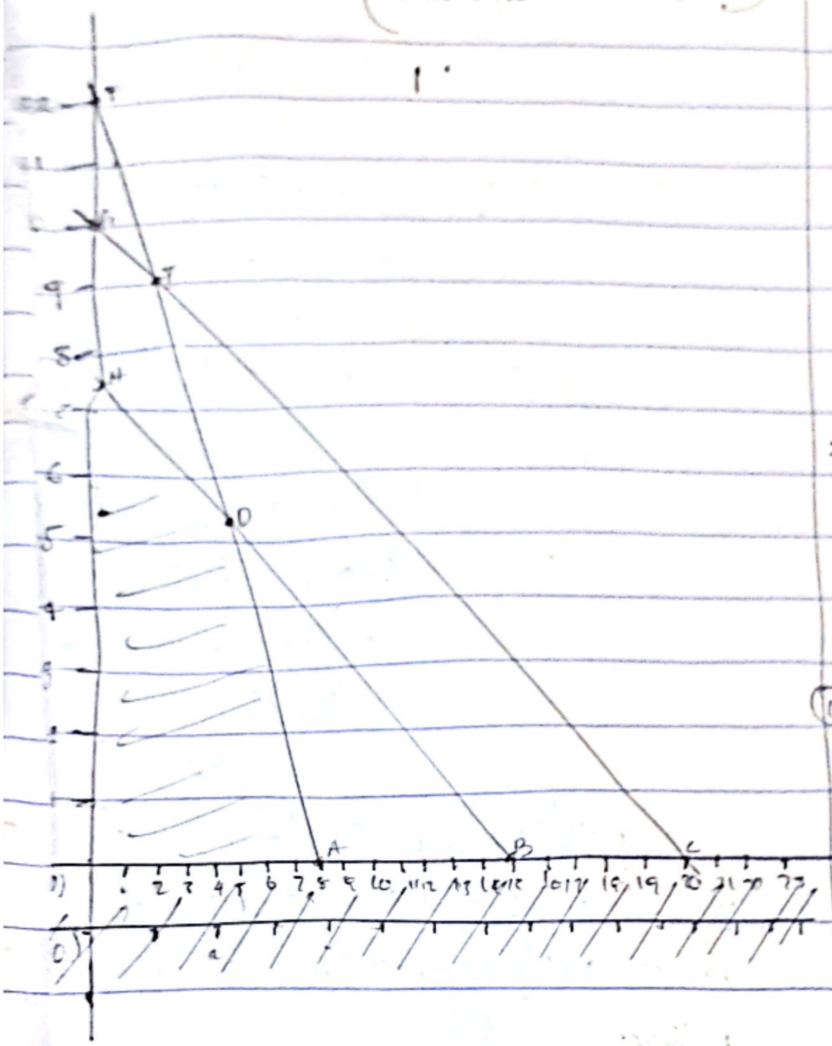
Dividing

2x + 2y =

4x + 3y =

Scale:
(1cm to 1unit on y-axis
1cm to 1unit on x-axis)

1.



Extreme points
O (0,0)
A (8,0)
B (15,0)
C (20,0)
D = (?) Now (4-5.5.3)
= (?) Now (2, 9)
= (0, 12)
= (0, 10)
= (0, 7.5

Finding the feasible region
If x and $y = 0$ for all equations
$2x + 4y \leq 30$
$2(0) + 4(0) \leq 30$
$0 \leq 30$

$x + 2y \leq 20$
$0 + 2(0) \leq 20$
$0 \leq 20$
$\therefore 0 \leq 30$
$0 \leq 24$
$0 \leq 20$

Finding the values of the coordinate D(?) and E(?) via simultan equation

For E

① $3x + 2y \leq 24$ --- ②
$2x + 4y \leq 30$ --- ①
$x + 2y \leq 20$ --- ③

$3x + 2y = 24$
$- \; x + 2y = 20$
$2x \quad 0 = 4$
$x = 4/2$
$x = 2$
subs $x = 2$ into eqn 3
$x + 2y = 20$
$(2) + 2y = 20$
$2y = 20 - 2$
$2y = 18$
$y = 18/2$
$y = 9$ ($x = 2, y =$
E = (2, 9)

② for D
$2x + 4y = 30$ --- ① × 3
$3x + 2y = 24$ --- ② × 2