

X1 - Test 03

Q-1) (c) 20

$$C(n, r) = C(n, n-r)$$

$$13 = n - 7$$

$$n = 20$$

Q-2 (b) 13

$${}^nC_2 = 78$$

$$\frac{n!}{(n-2)!2!} = 78$$

$$n(n-1) = 156$$

$$n = 13$$

Q-3 (a) $(-10, 0)$

Q-4 (b) $\frac{a}{c} < \frac{b}{c}$

Q-5 (a) $(-\infty, 5]$

Q-6 (a) 120

$$Q-7) \quad b) 31$$

$$Q-8) \quad b) 48$$

$$Q-9) \quad d)$$

$$Q-10) \quad d)$$

$$Q-11(A) \quad 4C_4 \times 48C_4$$

$$4 \times 194580$$

$$778,320$$

$$B) \quad r=3$$

$$Q-12 \quad 4! \times 5! = 24 \times 120 = 2880$$

$$Q-13(A)$$

$$\frac{4x+3}{2x-5} - 6 < 0$$

$$\frac{4x+3-12x+30}{2x-5} < 0$$

$$\frac{-8x+33}{2x-5} < 0$$



$$x \in (-\infty, \frac{5}{2}) \cup (\frac{33}{8}, \infty)$$

OR (B)

$$|x+2| \leq 15$$

$$x+2 \leq 15, \quad -(x+2) \leq 15$$

$$x \leq 13$$

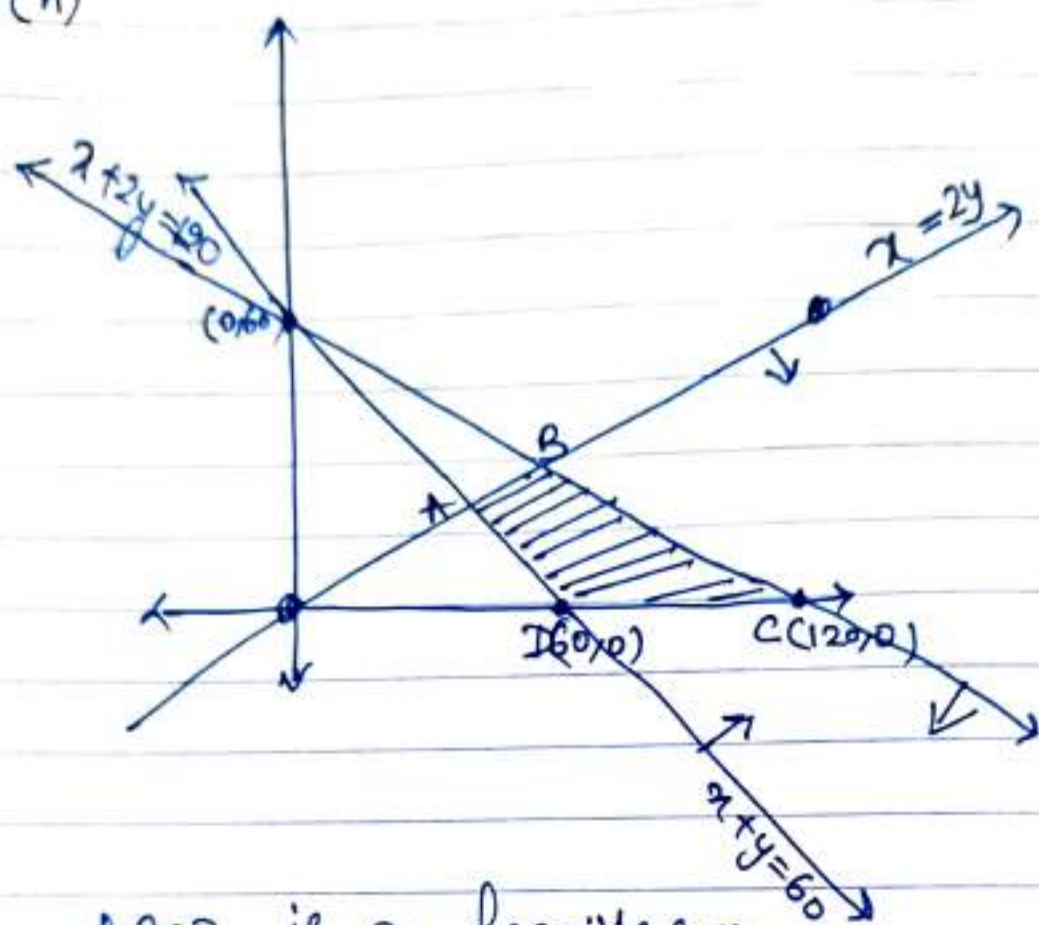
$$x+2 \geq -15$$

$$x \geq -17$$



$$x \in [-17, 13]$$

14(A)



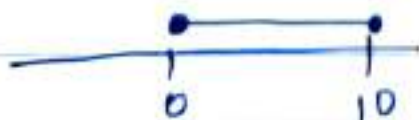
$ABCD$ is a feasible region

or (B)

$$|x-5| \leq 5$$

$$x-5 \leq 5, x-5 \geq -5$$

$$x \leq 10, x \geq 0$$



$$|x| \geq 2$$

$$x \geq 2, x \leq -2$$



Combined solution

$$x \in [2, 10]$$

$$15(*) (i) 12 \times \frac{10!}{2! \times 2! \times 2!}$$

$$12 \times 453600$$

$$5443200$$

$$(ii) 8! \times \frac{5!}{2! \times 2!}$$

$$20160 \times 30$$

$$604800$$

(B) (a) All these included

$${}^{17}C_5 = 6188$$

(Case 2) All these non included

$${}^{17}C_8 = 11440$$

$$\text{Total ways : } 6188 + 11440$$

$$17628.$$

16 (i)

possibilities are:

0000, 1111, 2222, 9999

Total ways: 10

(ii) (0, . . . 9)

1 way 4 8 5 ways (0, 1, 2, 3, 4, 5)
fixed fixed

Total 160
ways

(iii) a)

Position 1 1 3 X Even $\rightarrow 10 \times 5$
50

Position 2 X 1 3 Even $\rightarrow 10 \times 5$
 $= 50$
 $- 1$ (if both same)
 $= 49$

Total ways $50 + 49$
 $= 99$ ways

b)

$\frac{7}{\text{fixed}}$ que que que

= 64 ways.

17 (i) sides $2x+30$
 $4x-1$
 14

$$(2x+30) + (4x-1) \geq 14+6$$

$$x \geq 1.5$$

$$(ii) \quad 2x+30 > 4x-1$$

$$x < 15.5$$

iii (a)

$$2x+30+4x-1+14 \geq 61$$

$$6x+43 \geq 61$$

$$6x \geq 18$$

$$x \geq 3$$

or

$$6x+43 \leq 82$$

$$x \leq 6.5$$

18(a) Rank of MOTHER is 301

(b)

At least 5 women.

$${}^9C_5 \times {}^8C_2 + {}^9C_6 \times {}^8C_6 + {}^9C_7 \times {}^8C_5 + {}^9C_8 \times {}^8C_4 \\ + {}^9C_9 \times {}^8C_3$$

$$= 1008 + 2352 + 2016 + 630 + 56$$

$$= 6062$$

(c) At 7 women (majority)

$${}^9C_7 \times {}^8C_5 + {}^9C_8 \times {}^8C_4 + {}^9C_9 \times {}^8C_3$$

$$= 2016 + 630 + 56$$

$$= 2702$$

ii) Majority men (at least 7 men)

only one case ${}^9C_5 \times {}^8C_7$ ($\because {}^9C_4 \times {}^8C_8$ not possible as must include 5 women)
 $= 1008$

19: $120 < x < 300$.