Aptitude and Reasoning

P and C (Permutation & Combination).

'F.P.C.' → Fundamental principle of counting
↳ 25 Qn's out of 30 Qn's

F.P.C. → Additive Rule → $10 + 12 = 22$ ways
only one thing at a time

10 Boys 12 Girls

'a' monitor → 22 ways

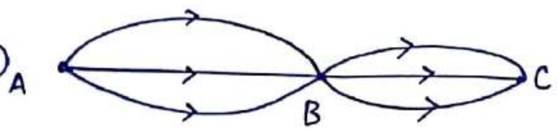
'OR' → additive Rule can be applicabl hidden in the meaning of question.

└→ Product Rule → $\boxed{1B \,\&\, 1G \text{ monitor}}$
More than one thing
$10 \times 12 = 120$ ways

and
qn. → hidden or given or available

Ex:- ①
B_1 — G_1, G_2, ..., G_{12}
B_2 — G_1, G_2, ..., G_{12}
- - - - - -
B_{10} — G_1, G_2, ..., G_{12}

$10 \times 12 = 120$

② 

A → C
6 ways + 3 = 9 ways
(3×3)

* Arrangement

$${}^{n}P_r = \frac{n!}{(n-r)!}$$

6 chairs, 6 members.

Ex:- $6 \times 5 \times 4 \times 3 \times 2 \times 1$

$${}^{6}P_6 = \frac{6!}{0!} = 720 \text{ ways}$$

if 2 chairs broken

$${}^{6}P_4 = \frac{6!}{2!} = 360 \text{ ways}$$

Q.> $\{a, b, c\} \rightarrow \{ab, bc, ca\}$

selen.
$${}^{n}C_r = \frac{n!}{(n-r)! \times r!} \Rightarrow {}^{3}C_2 = \frac{3!}{1! \times 2!} = 3 \text{ ways.}$$

Q 12 people (handshake)

$$^{12}C_2 = \frac{12!}{10! \times 2!} = \frac{12 \times 11}{2} = 66 \longrightarrow \boxed{^nC_2 = \frac{n(n-1)}{2}}$$

Q 12 points (str. line)

$$^{12}C_2 = 66$$

* $^nC_r = {}^nC_{n-r} \longrightarrow$ Ex:- $^5C_2 = {}^5C_3$, $^8C_5 = {}^8C_3$

Q1> All 6 digited natural no.'s are being formed from 1st 6 natural no's without repeatition. (w. Rn). How many such no.'s are divisible by 4?

Q2> How many 4 digit no. can be formed with 10 digits 0, 1, ... 9. If no number can start zero and if repeatition are not allowed?
[Gate Q.2015]
[Qn. 105]

Q3> given digits 2, 2, 3, 3, 3, 4, 4, 4, 4. How many distinct 4 digit no's greater than 3000 can be formed?
(Q4 Pg 69)
(Gate 2010)
(a) 50 (b) 51 (c) 52 (d) 54.

Q4> All 4 digited natural no.'s are being formed from 1st five natural numbers. How many such no.'s are divisible by 4.

Me

Sol> ① 1 2 ~~3~~ ~~4~~ ~~5~~ 2 — 240 — 1, 2, 3, 4, 5, 6

$24 \times 5 = 120$

② 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

9 9 8 7 = 4536

$\times 56$

4×3 12

③ ~~2~~ ~~7~~ ~~6~~ ~~5~~ = ~~5103~~ 420

1, 2, 3, 4, 5

④ 5 5 5 1 — 250 — ~~125~~

Sir → ① 192
② 4536
③ 51
④ 125

explanations

①
$\underline{1} \times \underline{2} \times \underline{3} \times \underline{4}$ $\underline{T}\ \underline{U}$ → 8 ways

1, 2, 3, 4, 5, 6

TU	TU
12	36
16	52
24	56
32	64

20	28	44 ✗
40	48	
60	68	
80	88	
08	✗	
04		
✗		

$\Rightarrow 4 \times 3 \times 2 \times 1 \times 8 = \boxed{192 \text{ ways}}$

② $\underline{9} \times \underline{9} \times \underline{8} \times \underline{7} = \boxed{4536}$
(1 to 9) (0 to 9) (0-9) (0-9)

④ $\underline{5} \times \underline{5} \times \underline{T}\ \underline{U}$ → 5

1, 2, 3, 4, 5

1	2
2	4
3	2
4	4
5	2

→ 5 ways

$\boxed{125}$ Ans

③ 2, 2 3, 3, 3 4, 4, 4, 4

① × ③ × ③ × ③

Th = 3

2 or 3 or 4

$\boxed{27 \text{ ways}}$
such no.'s are there

① 3222 but two 2's are allowed
→ invalid no. also 3333 ✗

1 ③ ③ ③ = 27

Th = 4

2 or 3 or 4   2/3/4   2/3/4

− 1 (4222) → invalid

Total no. = 54 − 3 = 51 no.'s Ans
(valid)

other way.

②	③	③	③	= 54
3/4	2, 3, 4	2/3/4	2/3/4	− 3
				51

Q There are 12 towns equally to be divided into 4 zones. each town is connected to every other town in the same zone by 3 direct lines and ~~each town is~~ each town is connected to every other town outside the zone by single direct line. How many lines are to be laid/built?

Sol 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Me __ __ __ __

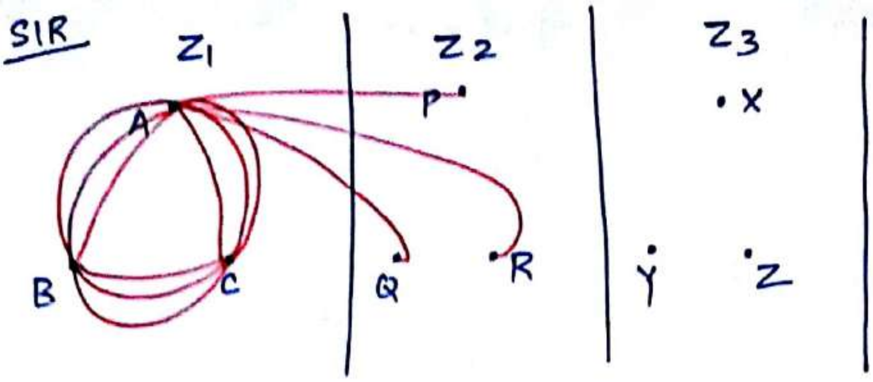
1 2 3 4   5 6 7 8   9 10 11 12

3 (81)   (81)   (81)

(32)

8
8
8
8

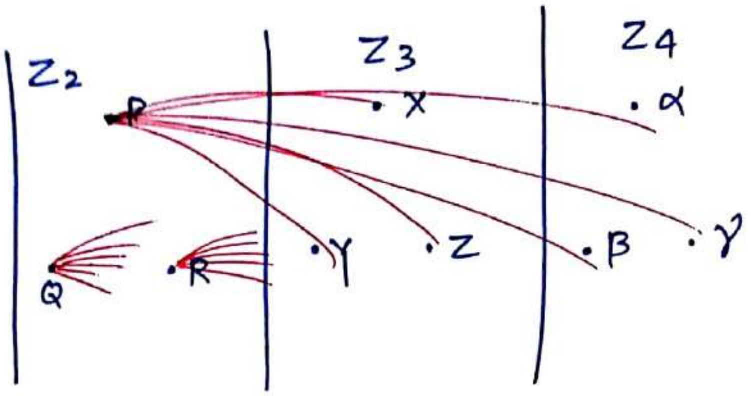
SIR



36 lines (all internal connections established)

+ 27 lines (external conn^ns)

Now



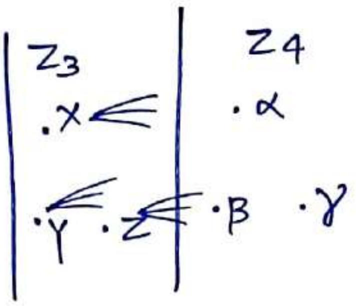
+ 18 lines

($P \rightarrow XYZ\alpha\beta\gamma$)

($Q \rightarrow$ —,,—)

($R \rightarrow$ —,,—)

Now



+ 9 lines

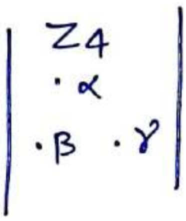
($\cancel{R}$ $X \rightarrow \alpha\beta\gamma$)

($Y \rightarrow \alpha, \beta, \gamma$)

($Z \rightarrow \alpha, \beta, \gamma$)

Total = 90 Ans ∴

Now



Q:> 10 identical Balls are to be distributed among 3 friends. In how many ways can the distribution be done?

Sol:> whole no. sol^n.

$a + b + c = 10$

a	b	c
0	0	10
0	1	9
0	2	8
	⋮	⋮
	10	0

$\rightarrow 11$

+

$a + b + c = 10$

1	0, 2, ..., 9	9, 8, ..., 0	$\to 10$ +
2	0, 1, ..., 8	8, 7, ..., 0	$\to 9$ +
⋮	⋮	⋮	+
9	0, 1	1, 0	$\to 2$ +
10	0	0	$\to 1$

$11 + 10 + 9 + 8 + 7 + 6 + 5 + \cancel{4} 4 + 3 + 2 + 1 = 66$

(or)

$\frac{11 \times 12}{2} = 66$ ✓

$\frac{n(n+1)}{2}$

Shortcut

① $^{(n+r-1)}C_{(r-1)}$

① $n \to$ identical objects

② whole no. soln. — applicable

whole no. soln. $\to$ means can give 0 ball also.

$n \to$ identical objects

$r \to$ no. of people.

here sol $^{(10+3-1)}C_{(3-1)}$

$= {}^{12}C_2 = \frac{12 \times 11}{2} = 66.$

Now

Natural No. solⁿ.

$a + b + c = 10$

1	1, 2, ..., 8	8, 7, ..., 1	$\to 8$ +
2	1, 2, ..., 7	7, 6, ..., 1	$\to 7$ +

$\frac{8 \times 9}{2} = 36$

7	1, 2	2, 1	$\to 2$ +
8	1	1	$\to 1$ +

No need

Shortcut — **CONDITIONAL Soln.**

N. No. soln

$a + b + c = 10$

1   1   1

whole No. solⁿ. ($\because$ 1 Balls all have)

$A + B + C = 7$

0 Balls can be possibly assigned to anyone

hence,

$^{7+3-1}C_{3-1}$

$^{9}C_2 = \frac{9 \times 8}{2} = 36$ ✓ Ans

$\left\{ \because {}^{n}C_2 = \frac{n(n-1)}{2} \right\}$

Q 15 identical Balls are to be distributed among 4 friends (A,B,C,D) such that A should get atleast 3 balls, B atleast 2, C atleast 1. In how many ways can the distribution be done

Sol

$$A + B + C + D = 15$$
$$3 \quad 2 \quad 1 \quad 0$$

$15 - 6 = 9$

$$A + B + C + D = 9$$

$$^{9+4-1}C_{4-1} \qquad ^{12}C_3 = \frac{12!}{3!\,9!} = \frac{12 \times 11 \times 10 \times \cancel{9!}}{\cancel{9!} \times 3!}$$

$$= \frac{\cancel{12}^{4} \times 11 \times \cancel{10}^{5}}{\cancel{6}}$$

$$= \underline{220.}$$

* $\boxed{\text{GEOMETRICAL P and C}}$:-

12 points

st. lines

$^{12}C_2$ (if no points are collinear) $-$ $^{5}C_2$ (5 points are collinear) $+ 1$ (one line possible)

$^{n}C_2 \qquad ^{r}C_2$

---

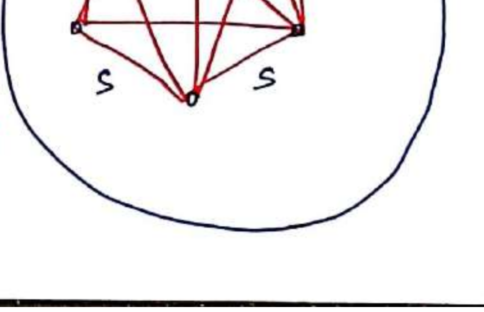
12 points

Δ's

$^{12}C_3$ (if no points are collinear) $-$ $^{5}C_3$ (5 points collinearity)

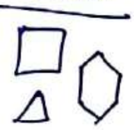
$^{n}C_3 \qquad ^{r}C_3$

No. of diagonals of any 'n' sides polygon $= \frac{n(n-3)}{2}$



Polygon n sides

n vertex



$^{n}C_2$ = All sides + All Diag

(n)

any 2 vertex makes hand shake

↓

side, Diagonal

$$\left\{ \begin{array}{l} ^{n}C_2 - n = \text{All diagonals} \\ \frac{n(n-1)}{2} - n = \frac{n(n-3)}{2} \end{array} \right\}$$

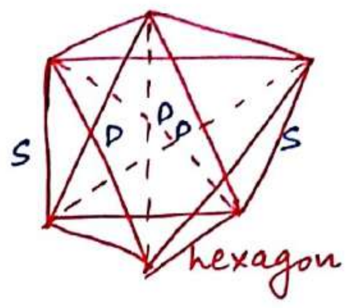
Q> If no. of diagonals of a n sided polygon is 50% more than its no. of sides then the polygon is —

Sol $\because$ $1.5\cancel{n} = \dfrac{\cancel{n}(n-3)}{2}$

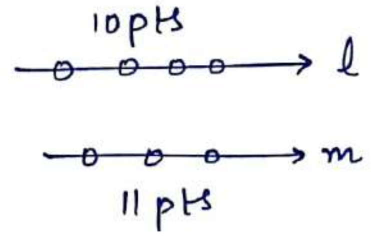
$n - 3 = 3$

$\boxed{n = 6} \rightarrow$ sides, 9 diagonals

S → 6, D → 9



Q> $l \parallel m$

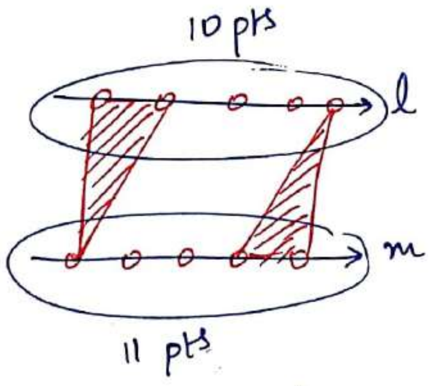


how many Δ's can we get from these 21 pts.

Sol $^{21}C_3 - {}^{10}C_{10} - {}^{11}C_{11}$ ✗

$1330 - 1 - 1$

Sol



$\underbrace{^{11}C_2 \times 10}_{550} + \underbrace{^{10}C_2 \times 11}_{445} = 1045$ ✓

$^{21}C_3 - {}^{10}C_3 - {}^{11}C_3 = 1045$ ✓

{all 3 should not from the same line}

Chess Board $\rightarrow {}^{n+1}C_2 \rightarrow {}^{n+1}C_2 = \left[\frac{(n+1)n}{2}\right]^2$

$\rightarrow$ 204 squares

${}^9C_2 \times {}^9C_2 = 1296$ Rectangles

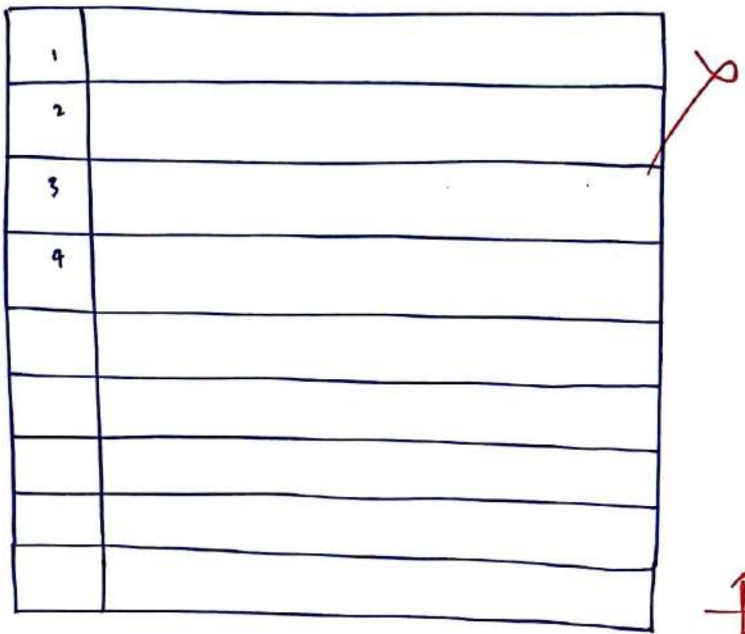
${}^nC_2 = \frac{n(n-1)}{2}$

1) Rectangles $\rightarrow {}^9C_2 \times {}^9C_2 \rightarrow 1296$ $\quad \boxed{\Sigma n^3 = \left[\frac{n(n+1)}{2}\right]^2 = 1296}$

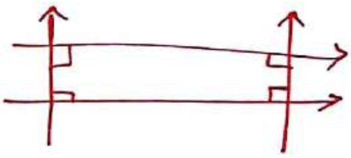
(nxn)

2) Squares $\rightarrow$ $\boxed{204 \;\; \Sigma n^2 = \frac{n(n+1)(2n+1)}{2} = 204}$ put $n = 8$

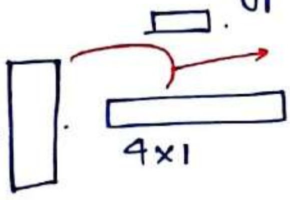
3) different types of Rectangles $\rightarrow$ $\boxed{\Sigma n = \frac{n(n+1)}{2} = 36}$ put $n = 8$



area & perimeter same $\rightarrow$ then sametype



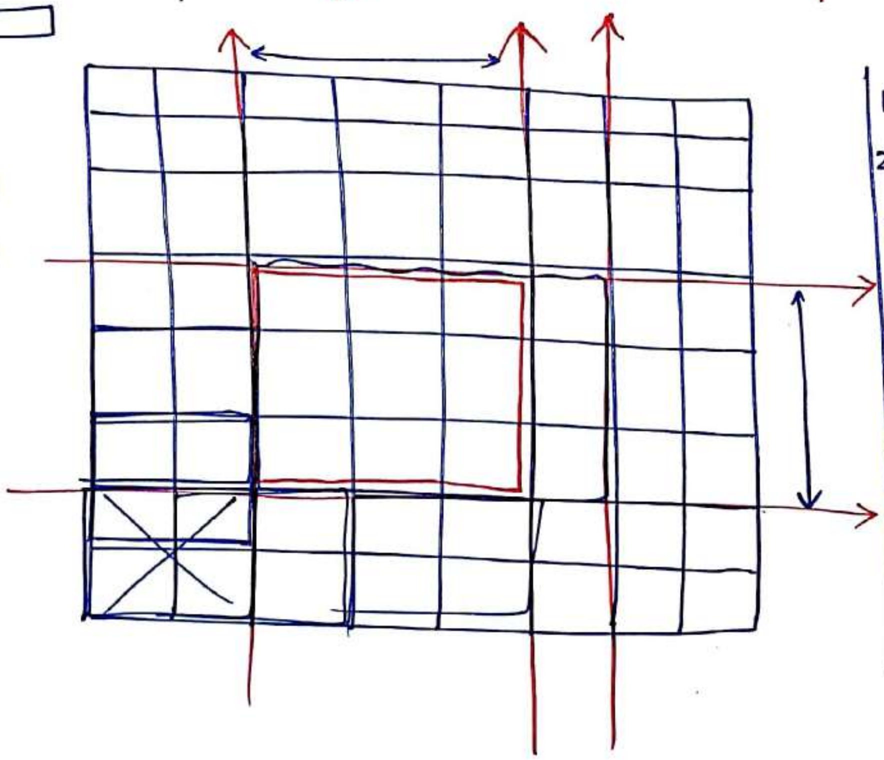
orientation diffr.



P = 10 $\quad$ P = 10

A = 4 $\quad$ A = 10

hence same Rectangle.



$1\times1 \rightarrow 64 \rightarrow 8^2$

$2\times2 \rightarrow 7^2 \rightarrow 49$

$3\times3 \rightarrow 6^2 \rightarrow 36$

$\vdots$

$7\times7 \rightarrow 4 \rightarrow 2^2$

$8\times8 \rightarrow 1 \rightarrow 1^2$

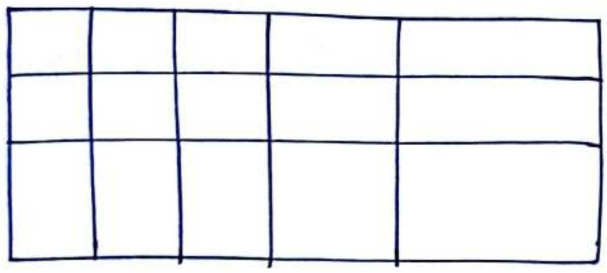
204

1×1, 1×2, 1×3 . . . . . . 1×8 → 8 types
2×1 2×2, 2×3, 2×4, ... 2×8 → 7 types
3×1, 3×2, 3×3, 3×4, 3×5, ... 3×8 → 6 types
⋮
8×8 → 1 types

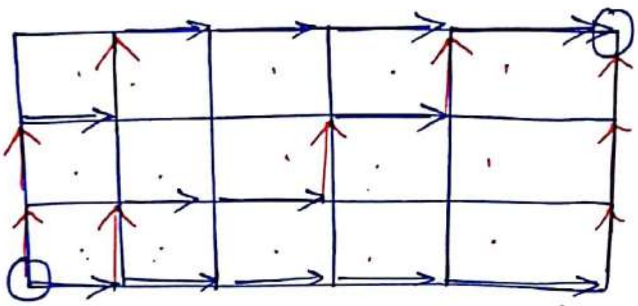
→ all squares are included (आने दो)

$\boxed{36}$

Gate 2017
2marks



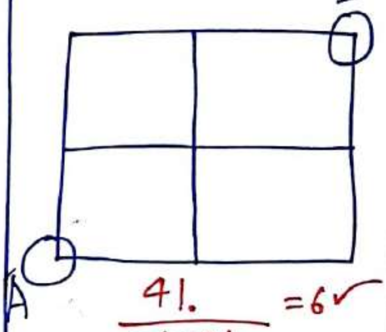
Redraw



A B

Shortest Routes (A to B)

CSAT (2011)



A B

$\frac{4!}{2! \times 2!} = 6$ ✓

how many shortest routes are possible b/w A & B?

Sol $\frac{(R+C)!}{R! \times C!}$ $\frac{(5+3)!}{5! \times 3!} = 56.$

Ex:- Apple $= \frac{5!}{2!} = 60$

BANANA $= \frac{6!}{3! \times 2!}$

[HHHHH VVV] $= \frac{8!}{5! \times 3!} = 56$

{HVHVHVHH}
. . . .

* Linear Arrangement / Permutation :-

$3 \times 2 \times 1 = 3! \quad (n!)$

_ _ _

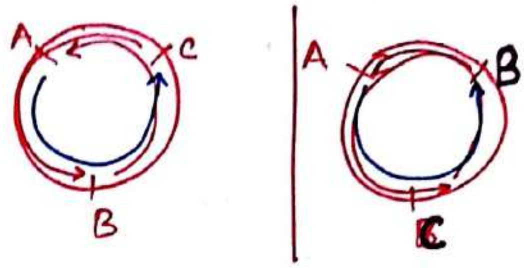
a b c
a c b
b c a
b a c
c a b
c b a

} 6 ways

circular P^n / circular arrangement.

$(n-1)!$

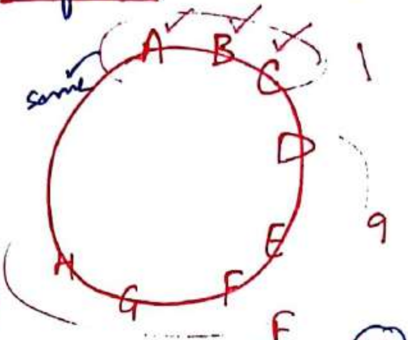
$(3-1)! = 2! \quad$ (2 ways)



Q.> A couple invited their 10 friends to a dinner party to be held across a circular dinning table having 12 chairs such that there have to be exactly 1 friend b/w the couple.

Sol

$8! \times$



SIR

H, W can interchange

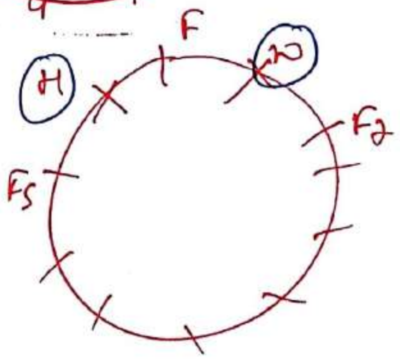
H	F	W

+ 9

$\underbrace{2!\ (10 \times 9!)}$

$2! \times 10!$

$2 \times 10!$ Ans



Q.> all 5 digited natural No.'s are being formed from 1st five natural no.'s without repeatition. what is sum of all of those no.'s

$(n-1)! \times \underbrace{11111}_{\rightarrow n \text{ times}} (\Sigma d)$ —digits

$(5-1)! \times 11111 (1+2+3+4+5)$

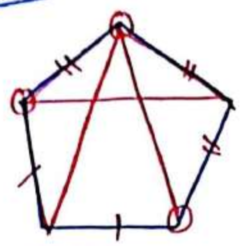
$4! \times 11111 \times 15$

CAT 2009

1, 3, 5, 7, 9

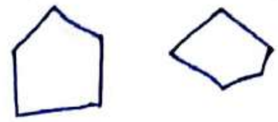
Q> vertex of a octagon are joined and Δ's are formed. How many Δ's are there whose vertex belongs to the vertex of octagon but none of its sides should belong to the side of octagon?

Sol SIR



zero

$n = 5$



me ✓.

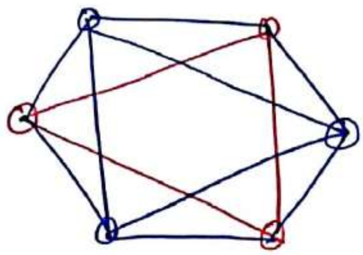
$n = 6$

$\Delta = \dfrac{n(n-5)}{3}$

$\dfrac{\cancel{6} \times 1}{\cancel{3}}$ ✗

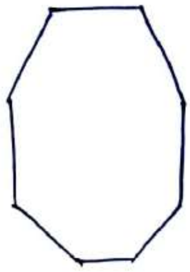
$\dfrac{8 \times \cancel{2}}{\cancel{3}}$

$\dfrac{8(\cancel{3})}{\cancel{3}}$



$n = 6$

two



$n = 8$

16

0 — 6 — 8

5 — 2 — 16

6, 2, 4, 3, 14, 11

$n^2 - (n^2 - 2)$

$36 - 34$

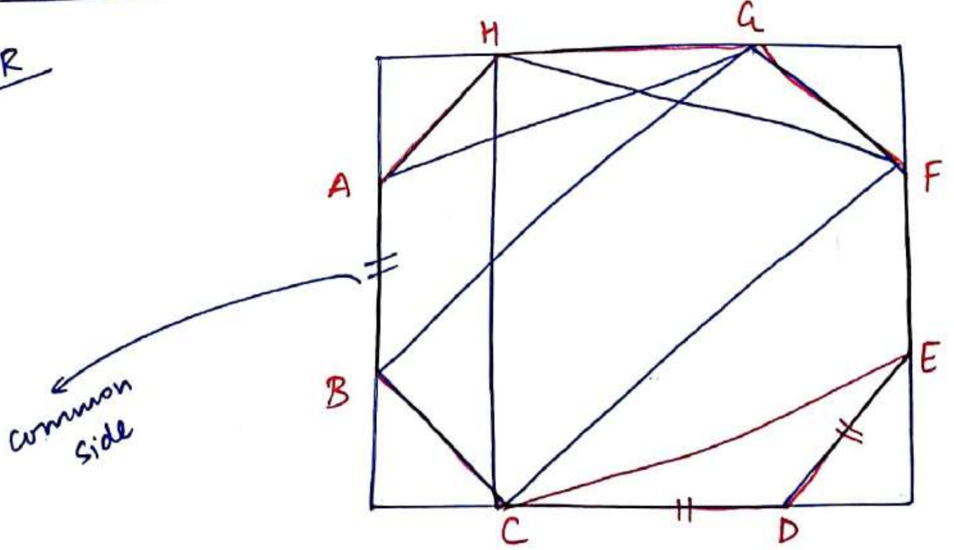
2

0 → 5

6 → 2

$8(3)$ ✗.

SIR



$T(\Delta) \Rightarrow {}^8C_3$ {no 3 colinear}

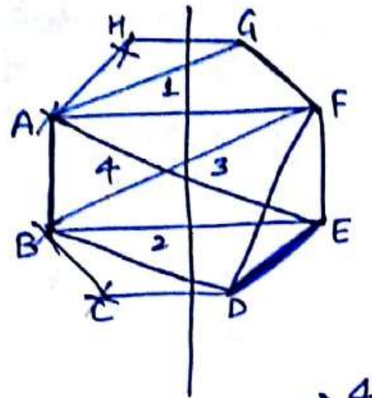
$T(\Delta) = \Delta(1)$ ← common side

$+ \Delta(2)$ (CDE)

$+ \Delta(0) \to$ HCF

${}^8C_3 = \Delta(1) + \Delta(2) + \Delta(0)$

?



$$T(\Delta) = \Delta(1) + \Delta(2) + \left(\underline{\Delta(0)}\ ?\right)$$

$$^8C_3 = (4\Delta \times 8) + \left(\overset{n}{8}\right) + \Delta(0)$$

$$56 = 32 + 8 + \Delta(0)$$

$$\boxed{\Delta(0) = 16}$$

0 side common

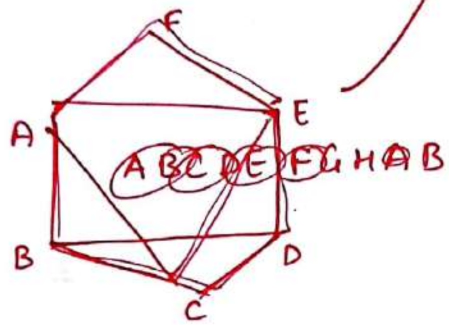
AB gone
HC also?

AB side $\rightarrow 4\Delta$

8 side $\rightarrow 8 \times 4\Delta$

$$^nC_3 = n(n-4) + n + \Delta(0)$$

4 points
gone



$$\boxed{\Delta(0) = {}^nC_3 - n(n-4+1)}$$

02/10/2016

PROBABILITY

Classical Defn :-

$$P = \frac{\text{favourable chances}}{\text{Total chances}} = \text{Probability}$$

Sample space $= \{1, 2, 3, 4, 5, 6\}$ in case of a dice

$SS = \{H, T\}$ in case of a coin

unbiased Events $\rightarrow$ every event (equally likely)

$P(1) = 1/6$
$P(2) = 1/6$
$P(3) = 1/6$
$\vdots \quad \vdots$
$P(6) = 1/6$

$P(H) = 1/2$
$P(T) = 1/2$

Mutually exclusive events

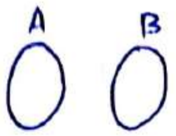
and

Independent Events

{Next Page}

✓ Mutually Exclusive events are events where happening of one event guarantees non-happening of the other.
means A → happen, B → not happen

A, B → disjoint sets



$\underline{P(A \cap B) = 0}$

for M.E.E.

Additive Rule $P(A \cup B) = P(A) + P(B) - \underline{\cancel{P(A \cap B)}} \to 0$

"or"

only one of the events happen @ time.

English identyfing key-word.

$P(A \cup B \cup C) = P(A) + P(B) + P(C)$.

Q → Dice

$P(even) + P(odd) - P(\cancel{even\ and\ odd}) \to 0 = P(even\ or\ odd)$

$\boxed{P(e \cup o)}$

$= 3/6 + 3/6 - 0$

✓ Independent Events are Events where more than one event can happened at a time without influencing the result of each other.

"and"

hint ($\cap$).

Ex:- Coin and dice is tossed simultaneously.

Product Rule P(3m) and P(t) ↳ tossed → (tail)

multiply

$2/6 \times 1/2 = 1/6$

$\underline{P(A) \times P(B) \times P(C)}$

Q> P(A) = 60% ⟶ A speaks Truth in 60% cases.

P(B) = 75%

while answering the same qn. in either "Yes" or "No" they are likely to fight with each other in what % chances

Sol> $P(A) = 3/5$, $P(\bar{A}) = 2/5$

$P(B) = 3/4$, $P(\bar{B}) = 1/4$

mutually exclusive

$$A \times \overline{B} + B \times \overline{A}$$

$$\frac{3}{5} \times \frac{1}{4} + \frac{3}{4} \times \frac{2}{5}$$

$$= \frac{9}{20} \approx \frac{45}{100} \approx 45\%$$

Q> There are 2 vacancies for which the husband and wife applied, $P(h) = 1/7 \rightarrow$ Probability of husband gets the job.

$P(\omega) = 1/5$

only one gets the job	both	None	atleast one	
?	?	?	?	

Q> X is randomly choosen from 1st 100 natural no., what is the probability that choosen x satisfies the inequality

$$\frac{(x-40)(x-70)}{(x-30)} < 0 \qquad x \in [0, 100]$$

a) $\frac{28}{50}$

b) $\frac{29}{50}$

c) $\frac{59}{100}$

d) $30/50$

Q> A and B decided to meet b/w 6 and 7p.m. on 14th Febr. 2017. what is the probability that they will meet provided one cannot wait for other for more than 20 minutes?

Q> Gate Qn.

Sol> ① $P(h) = 1/7$ ✓ $P(\bar{h}) = 6/7$

$P(\omega) = 1/5$ $P(\bar{\omega}) = 4/5$

$(1/7 \times 4/5) + (6/7 \times 1/5)$

$4/35 + 6/35$

$10/35$ $10/35$

0.28

0.02

0.68

③ 1 hr $5/9$

20 min

0.33×0.33

0.66

$0.25 \times \longrightarrow 0.0\cancel{X}625$

② $x - 40 < 0$ $29/50$ ✓

$x < 40,\ x < 70$

$x < 30$

$40\times$, $70\times$

✓$30\times$

$0 - 100$

$\frac{101}{3}$ $\frac{98}{101}$

0.97

④ $\rightarrow$ Gate $7/16$

SIB (1) $P(h) = 1/7$, $P(\bar{h}) = 6/7$

$P(w) = 1/5$, $P(\bar{w}) = 4/5$

only one	both	none	@ least one
$h \times \bar{w} + \bar{w} \times h$	$h \times w$	$\bar{h} \times \bar{w}$	
$1/7 \times \frac{4}{5} + 1/5 \times 6/7$	$1/7 \times 1/5$	$6/7 \times 4/5$	
$\frac{10}{35}$	$1/35$	$24/35$	

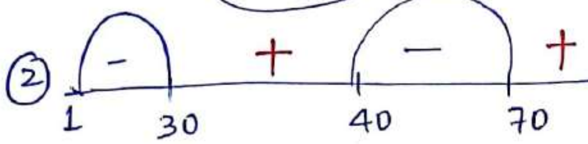
$1 = \text{only one} + \text{both} + \text{None}$

$1 = 10/35 + 1/35 + 24/35$

$1 - 24/35$

$11/35 \leftarrow P(\text{@least one})$

(2)

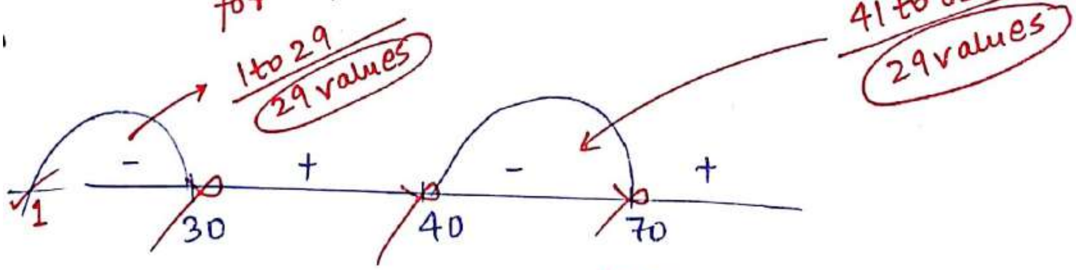


signs can be putted on the no. line in alternate fashion.

similarily

$$\frac{\overset{+}{(x-40)}\,\overset{+}{(x-70)}}{\underset{+}{(x-30)}} < 0$$

for $x > 70$



$x = 40$ $x = 70$

not allowed $\because < 0$

$$\frac{\text{fav. chances}}{\text{Total chances}} = \frac{58}{100} = 29/50.$$

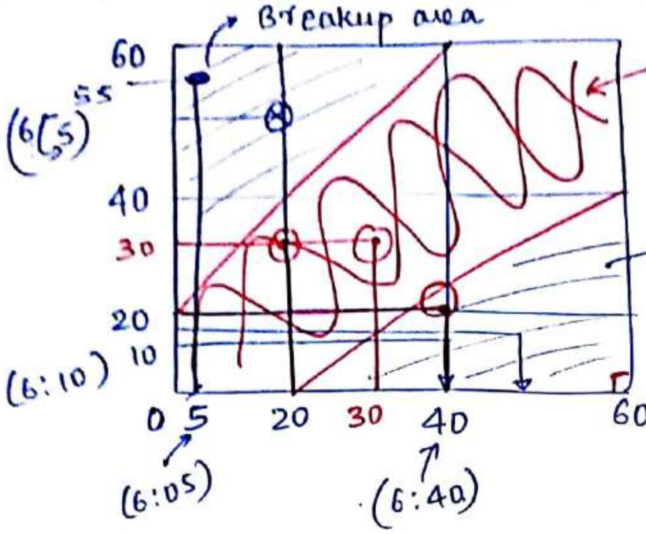
(3) Time $\longrightarrow$ Real No.

∞ no. of values b/w 6 & 7.

$$\frac{\text{favourable chances}}{\text{Total chances}} = \frac{\infty}{\infty} = \frac{f(A)}{T(A)}$$

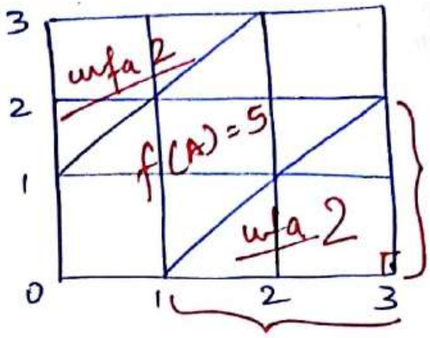
$f(A) \rightarrow$ favourable area

$T(A) \rightarrow$ Total area



$TA = \overline{9}$

$\Leftrightarrow$



6:20 - 6:40 → Just a moment.

here, $\Delta = \frac{1}{\cancel{2}} \times 40 \times \cancel{40}^{20} = 800$ units

unfav Area = 1600 units.

Total area TA = $\overline{60 \times 60} = 3600$

favourable area $fA = 3600 - (800 \times 2)$
$= \underline{2000}$

$$\frac{f(A)}{T(A)} = \frac{2000}{60 \times 60} = \frac{20}{36}$$

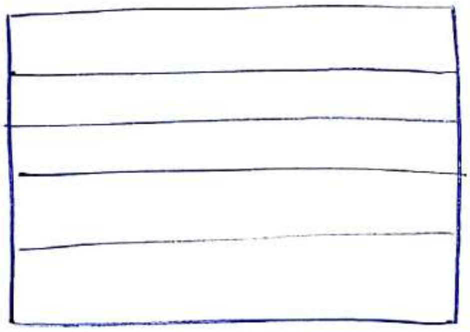
area $(\Delta) = \frac{1}{\cancel{2}} \times \cancel{2} \times 2 = 2$ units

unfavourable area = $2 \times 2 = 4$ units

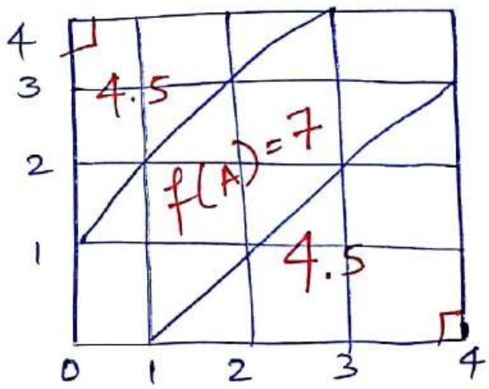
favourable area = $9 - 4 = 5$ units

hence, $\frac{f(A)}{T(A)} = 5/9$

(4)



Redrow →



$$\frac{f(A)}{TA} = \frac{7}{16}$$

$\boxed{\text{Conclusion}}$ ⟶ if TA ⟶ $\frac{\overset{(TA)}{3 \times 3} - \overset{(unfav)}{2 \times 2}}{3 \times 3} \overset{(fav)}{=} \frac{5}{9}$

if TA ⟶ $\frac{4 \times 4 - 3 \times 3}{4 \times 4} = \frac{7}{16}$

$\frac{6 \times 6 - 5 \times 5}{6 \times 6} = \frac{11}{36}$

$\boxed{\text{formulae } \frac{(2n-1)}{n^2}}$ Ans.

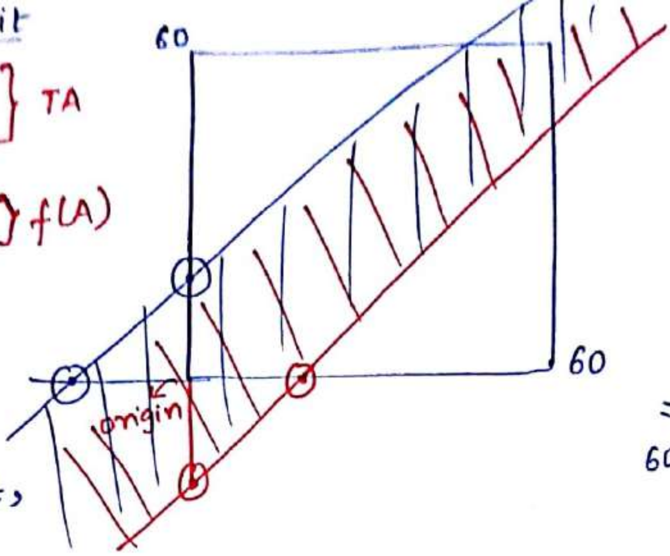
Maths behind it

$\left.\begin{array}{l} 0 \le x \le 60 \\ 0 \le y \le 60 \end{array}\right\}$ TA

$|x-y| \le 20 \}$ f(A)

$x - y = 20$

if $x - y \le 20$

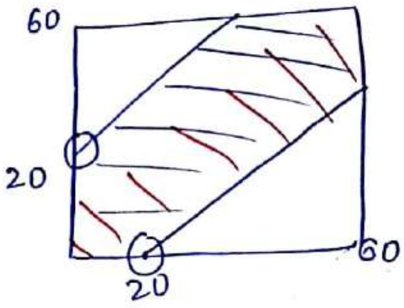


if y comes first,

$y - x = 20$

$y - x \le 20 \rightarrow$ To satisfy this inequality, we have to move towards origin.

$\Rightarrow$



Do $\longrightarrow$ (33) (41) Pg 72

(33) 1 - - - - - - - - 100 not divisible by 7

2digit integers.

7×7 49

7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98

(14) no.

10.

10 —— 100

$$\begin{array}{r} 91 \\ -\ 14 \\ \hline 77 \end{array}$$

SIR [1-100] $\div$ by 7

$\frac{100}{7} = 14$ [$\cancel{7}$, 14, 21, - - - 98]

[10 - 99] $\rightarrow$ Total No.'s = 90

div. by 7 $= (14-1) = 13$

$$\frac{fc}{TC} = \frac{77}{90}$$ ✓

- Rifaakun ....

(12) $1 Y = 366 d = 52 \times 7 + 2$ odd day → 2 chances of saturday

53rd saturday

FS
SS
SM
MT
TW
WT
TF

(7)

$\frac{2}{7}$ ← Ans:

$\frac{fc}{TC} = \frac{2}{7}$ ✓

* Sample space (dice) = {1, 2, 3, - - - 6}

P(even) = 3/6 ⟶ {2, 4, 6}

P(prime) = 3/6 ⟶ {2, 3, 5}

Q> (conditional Probability Based).

A dice is thrown at random. what is the probability of getting a prime no. on the dice provided the dice had shown an even number.

already shown.

Sol> $SS_{new} = [2, 4, 6]$

$P(prime) = P\left(\frac{prime}{even}\right) = \frac{1}{3}$ ✓

Pg 71 (20) X , Y

96/100

X → 60% ⟶ 96% reliable

Y → 40% ⟶ 72% — " —

0.576 0.288

T.S.A.(100)

x(60)   y(40)

$X_R = 0.96$ of 60

$Y_R = 0.72$ of 40

$X_R = 57.6$ + $Y_R = 28.8$

$T_R = X_R + Y_R = 86.4$

Y_R / T_R

Pg 75 53 $\frac{10}{100} \rightarrow$ HIV +

HIV + $\rightarrow$ 95% (Time)

HIV − $\rightarrow$ 89% (−,,−)

SIR

$$\left(\frac{0.1 \times 0.95}{(\underset{+ve}{0.1} \times \underset{+ve}{0.95}) + (\underset{-ve}{0.9} \times \underset{m/c \rightarrow +ve}{0.11})}\right)$$

(−ve होगा))

$\boxed{0.4896}$ Ans

Pg 54

⑤ $P(2) = 1$

$P(3) = 2$

$P(4) = 3$

$P(5) = 4$

$P(6) = 5$

$P(7) = 6$

$P(8) = 5$

$P(9) = 4$

$P(10) = 3$

$P(11) = 2$

$P(12) = 1$

{1, 6 / 2, 5 / 3, 4}

{6, 1 / 5, 2 / 4, 3}

36

Pg 54

⑥ $\frac{1}{3} \times \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$.

independent events

SIR

None of them solves qn. $\Rightarrow$ $[\bar{A} \times \bar{B} \times \bar{C} \times \bar{D}]$

Qn is not solved

Qn. is solved $\Rightarrow 1 - (\bar{A} \times \bar{B} \times \bar{C} \times \bar{D})$.

(or) atleast one of them solves Question

All of them solves the qn. $\} \Rightarrow A \times B \times C \times D$.

Q7 4 times

2H, 2T

HHHT	HH TH	HTHH	THHH
HHTT	HTHT	HTTH	THTH
HTTT	THTT	TTHT	TTTH
TTTT	HHHH		

$4/16 = 4$ $1/4$

H	H	T	T
H	T	H	T
H	T	T	H
T	H	H	T
T	H	T	H
T	T	H	H

$\frac{6}{16}$ → $4C_2$ → 6

alter.

alter. method $\rightarrow$ $4C_2 (1/2)^2 \, 2C_2 (1/2)^2$

6/16

Q 10 penalty shootouts.

$^{10}C_4 \rightarrow$ chances in which goal happens.

$\frac{4!}{0!\,4!}$

$^{10}C_4 (s)^4$ ↳ success $\;\; ^6C_6 (f)^6$

Pg 90

(1) 77 $\quad ^{10}C_6 \times \quad$ 0.2508

Pg 54

(10) $\frac{0.04}{100} = \frac{1}{25}$

Pg54

(1) $^nC_2 = $ h.shakes

$\frac{n(n-1)}{2} = 153$

(18) ✓

(2) ✓

* $\boxed{\text{LOGICAL REASONING}}$:-

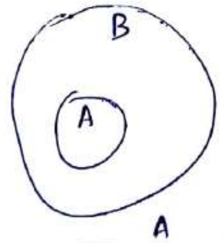
4 Rules :→ Rule 1 → draw all possibilities/(Cases).

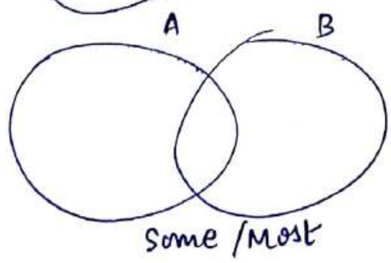
Rule 2 → for a statement to be True, it have to be true in all the cases.

Rule 3 → If a statement is false even in one of the case, then it will be considered false forever.

Rule 4 → Try to proof a statement false as early as possible.

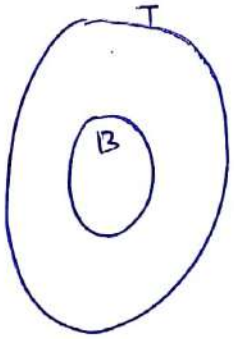
Rules/General → Read dirn's carefully !

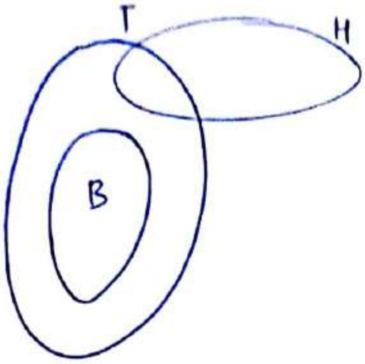


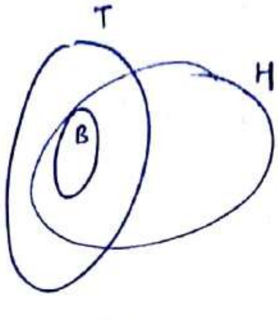


Some /Most

Q2

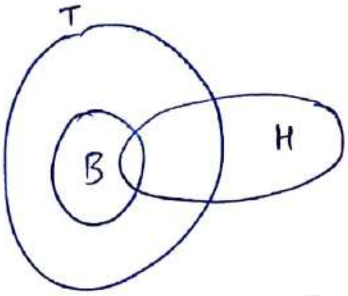




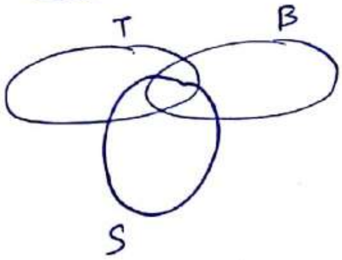


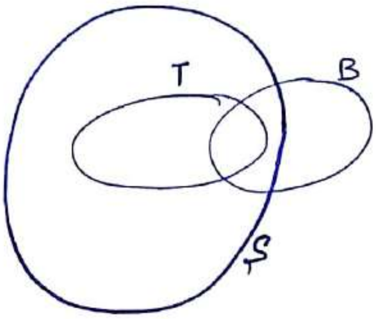
no informn about Hens and Birds hence, 3possibilities.

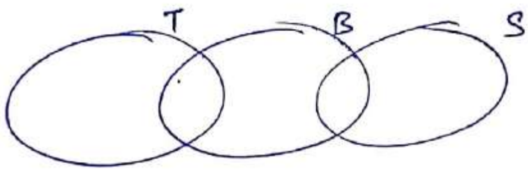
conc i ×
ii ✓ (b)



(3)

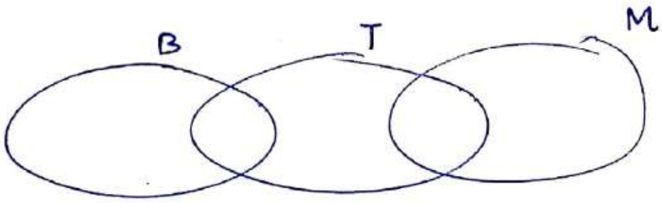






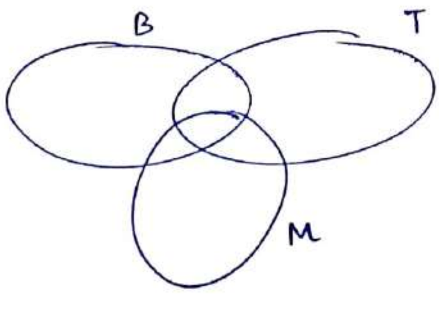
i. ✓ (a) ✓
ii ×

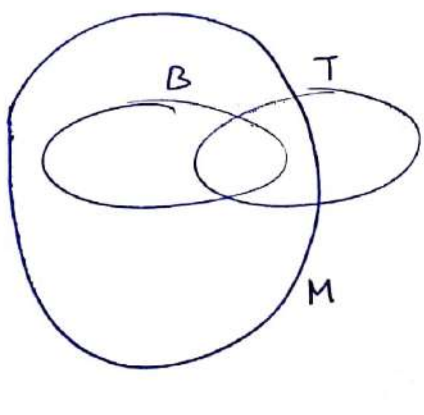
(4)



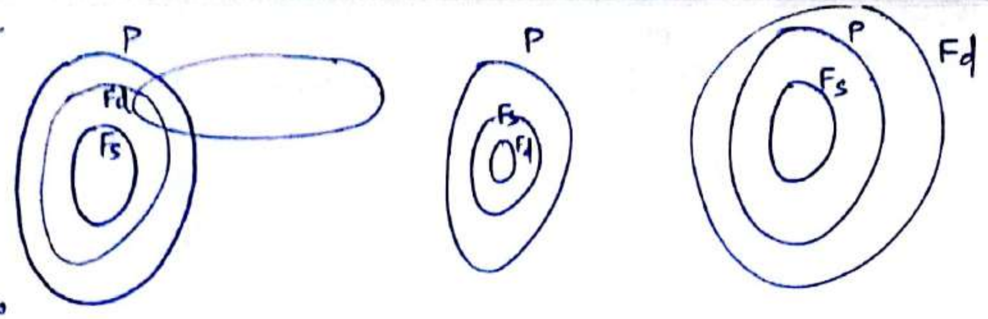
(i.) ×
(ii.) ×

(d) ✓



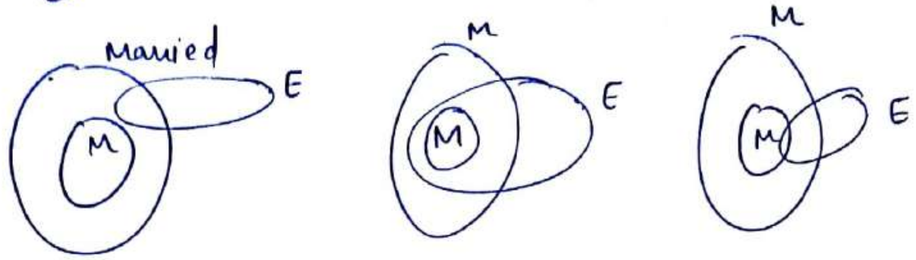


(5) me



(i) ✗
(ii) ✓ (b) ✓

(6)

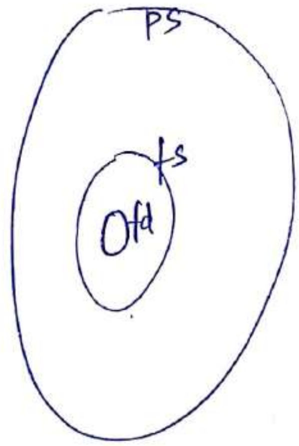


(i) ✓ (c)
(ii) ✓

(7)

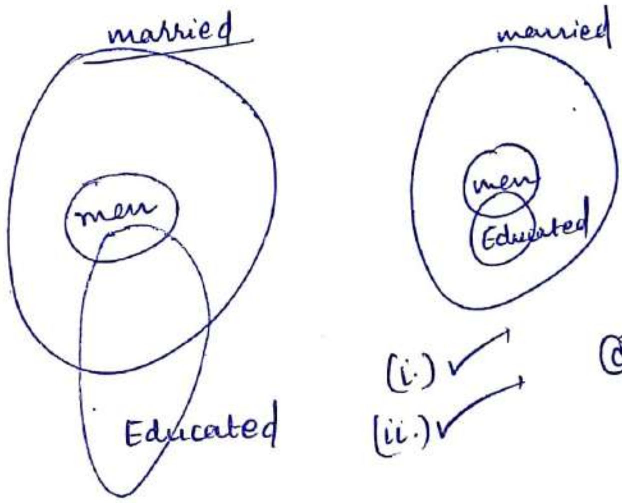
SIR

(5)



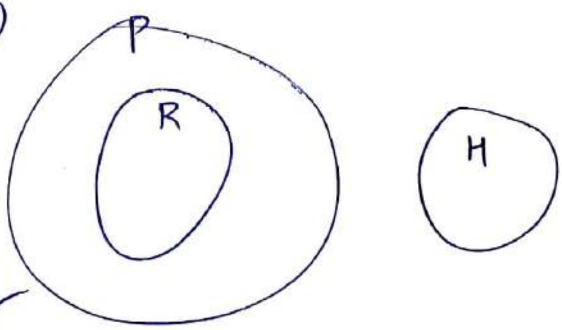
i ✓ (d) ✓
ii ✓

(6)



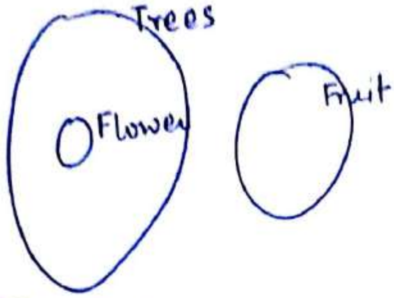
(i) ✓ (d) ✓
(ii) ✓

(7)



(1) ✗
(2) ✗ (c) ✓

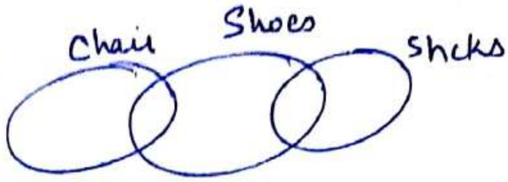
(8)



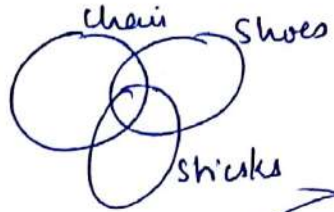
(1) ✓ (d) ✓
(2) ✓

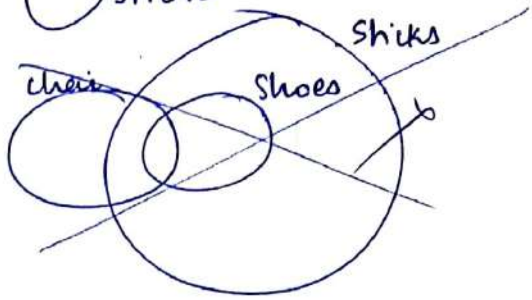
(11)

(a)



(b)

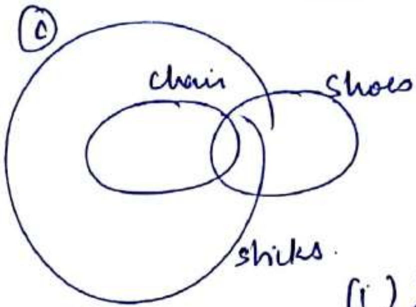




ME
(9)

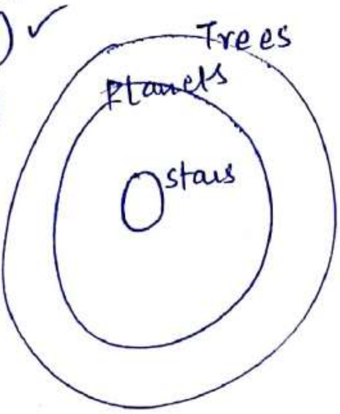
(i.) ✗
(ii.) ✗
(iii.) ✓ (c) ✓
(iv) ✓

(c)



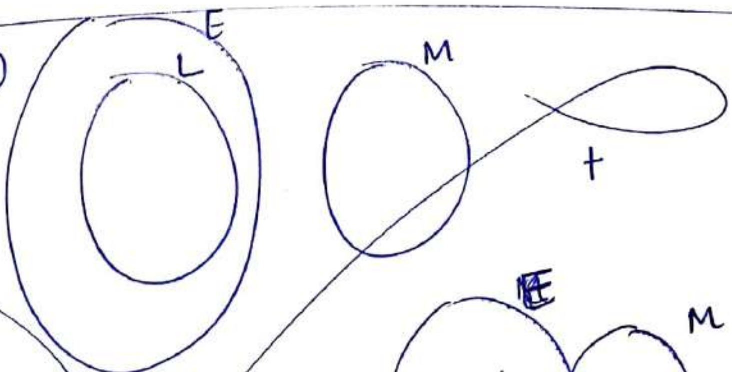
(i) ✗
(ii) ✗
(iii.) ✗
(iv) ✗.
(d) ✓

(10)

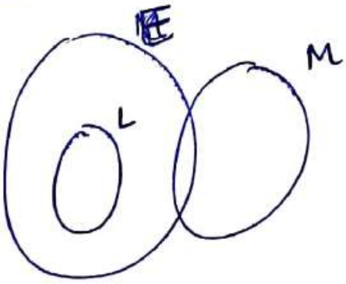


(i) ✗ (a) ✓
(ii) ✓
(iii) ✗
(iv) ✓

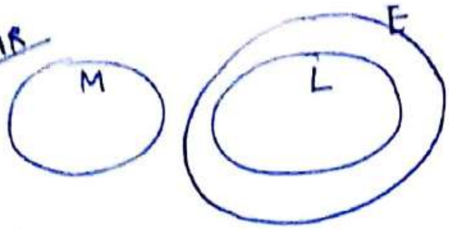
(36)



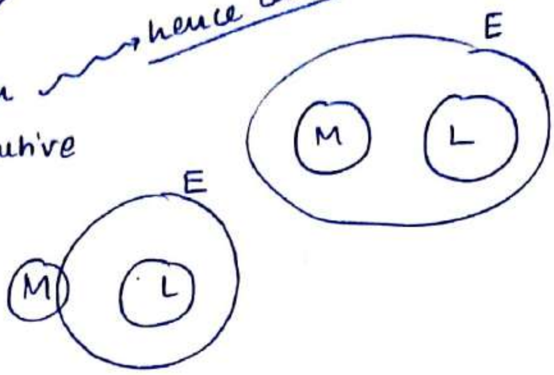
(i) ✓
(ii) ✓ (d) ✓



(136) S18



No informn about Manager and Executive → hence cases



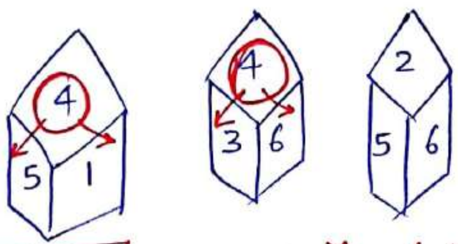
(i.) ✗ (Bullshit)

(ii.) ✗ —"—

(c) ✓

Pg no. (57)

8 to 9



$\boxed{4 \xleftrightarrow{opp.} 2 ✓}$

4 ⟷ 5✗ 1✗ 3✗ 6✗ opposite

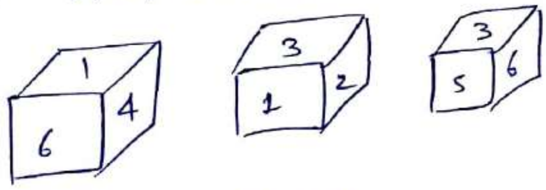
∵ all are adjacents

$\boxed{1 \xleftrightarrow{opp.} 6}$ → 3✗, 4✗, 2✗, 5✗ opposite

5 → 1✗ 4✗ 2✗ 6✗

$\boxed{5 \rightarrow 3}$ opposite.

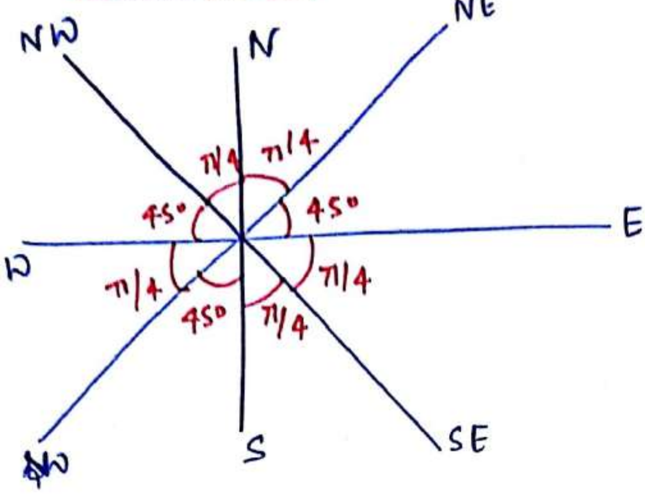
(11) 1, 2, 3, 4, 5, 6



1 →opp. 2✗ 3✗ 4✗ 6✗

1 ⟷ 5 opp. (a) ✓

* **DIRECTION** :-



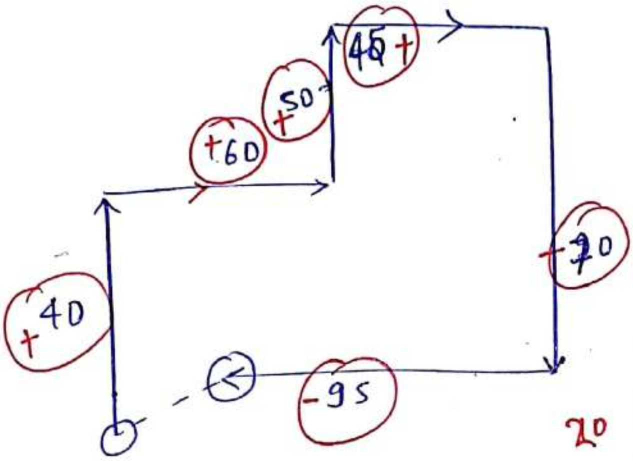
Horizontal (H) $= E^{+}, W^{-}$

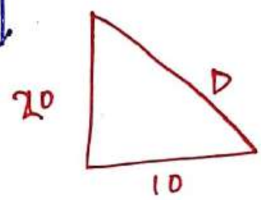
Vertical (V) $= N^{+}, S^{-}$

Apply pythagoras.

$$D = \sqrt{H^2 + V^2}$$

Q> Person goes 40m North take a Right turn goes 60 m takes a left Turn & goes 50m and takes another — " — " — 45m . . . . . .





$$D = \sqrt{20^2 + 10^2}$$

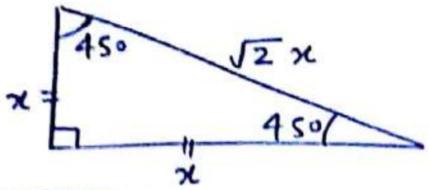
$$D = \sqrt{500}$$

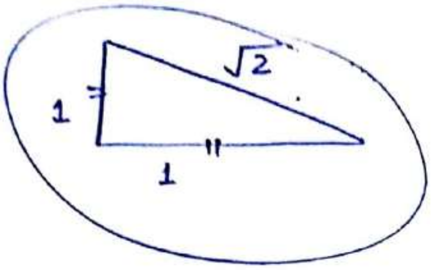
$$\boxed{D = 10\sqrt{5}}$$ Ans ∴

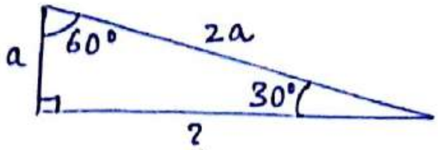
$$H = |60 + 45 - 95| = 10$$

$$V = |40 + 50 - 70| = 20$$

Isosceles Right ∠ Δ







$\sin 30^\circ = \frac{a}{h}$

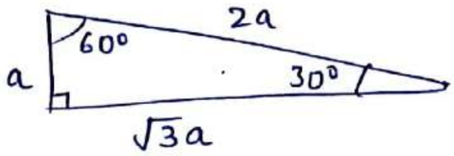
$\frac{1}{2} = a/h$

$\boxed{h = 2a}$

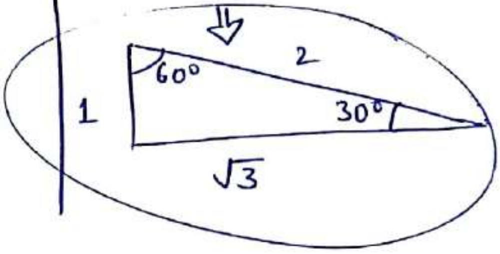
$\sqrt{a^2 + ?^2} = (2a)^{\cancel{2}}$

$a^2 + ? = 2a$

⇓



⇓



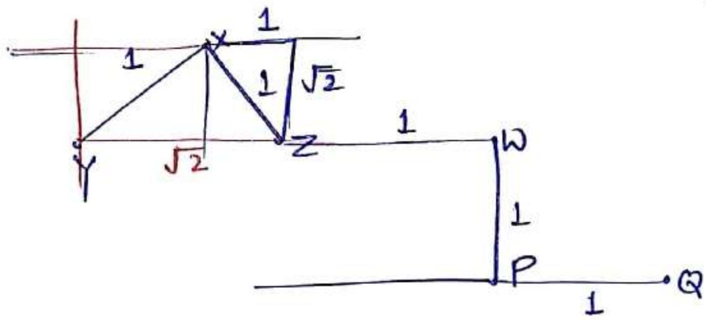
Pg 74

Q 52

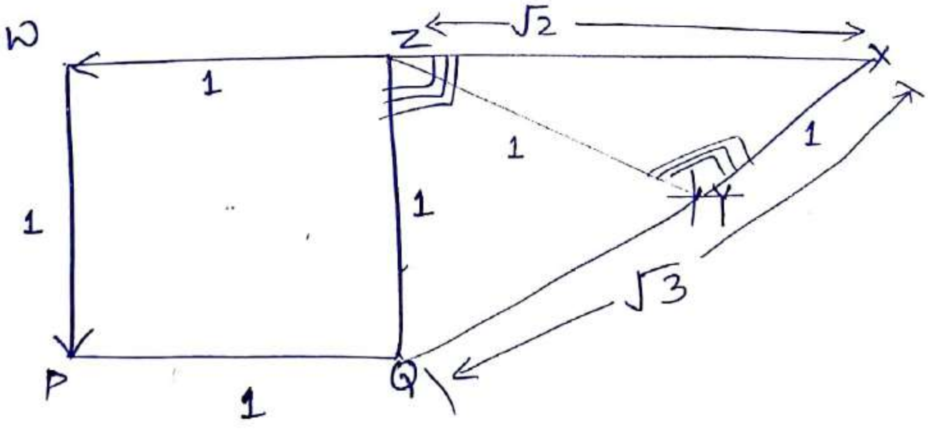
$+\sqrt{2} + 1 - \cancel{1} + \cancel{1}$

$+1 - \sqrt{2} + 1 - \cancel{1} + \cancel{1}$

2



SIR



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