

Series

(1) 7, 12, 19, —, 39

- (a) 29 (b) 28 (c) 26 (d) 24

answer.

$$7, 12, 19, \underline{\quad}, \underline{\quad}, 39$$

$\uparrow +5$ $\uparrow +7$ $\uparrow +9$ $\uparrow +11$

(2) 2, 5, 9, —, 20, 27

→

$$2, 5, 9, \underline{-14}, \underline{20, 27}$$

$\uparrow +3$ $\uparrow +4$ $\uparrow +5$ $\uparrow +6$ $\uparrow +7$

(3) 20, 19, 17, —, 10, 5

→

$$20, \underline{19}, \underline{17}, \underline{-14}, \underline{10, 5}$$

$\uparrow -1$ $\uparrow -2$ $\uparrow -3$ $\uparrow -4$ $\uparrow -5$

(4) 11, 12, 17, 18, 23, 24, —

→

$$11, \underline{12}, \underline{17}, \underline{18}, \underline{23}, \underline{24}, \underline{-29}$$

$\uparrow +1$ $\uparrow +5$ $\uparrow +1$ $\uparrow +5$ $\uparrow +1$ $\uparrow +5$

(5) 4, 6, 12, 14, 28, 30, —

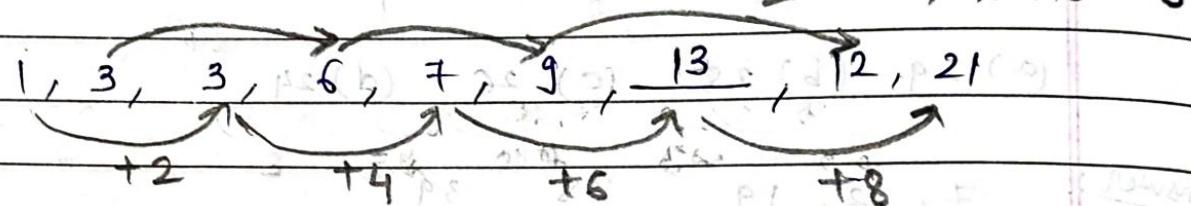
→

$$4, \underline{6}, \underline{12}, \underline{14}, \underline{28}, \underline{30}, \underline{-60}$$

$\uparrow +2$ $\uparrow *2$ $\uparrow +2$ $\uparrow *2$ $\uparrow +2$ $\uparrow *2$

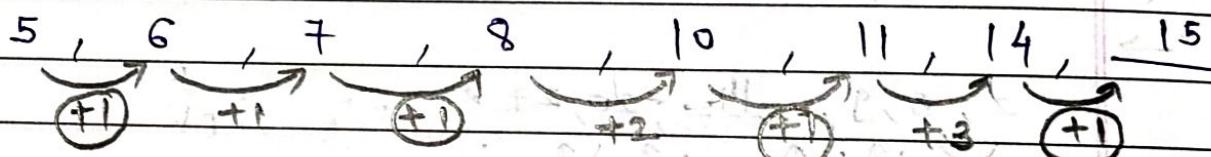
(6)

$$1, 3, 3, 6, 7, 9, \underline{\quad}, 12, 21$$



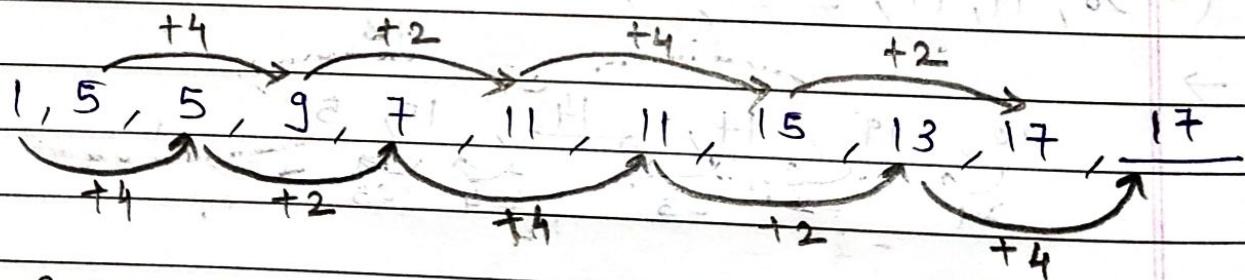
(7)

$$5, 6, 7, 8, 10, 11, 14, \underline{\quad}$$



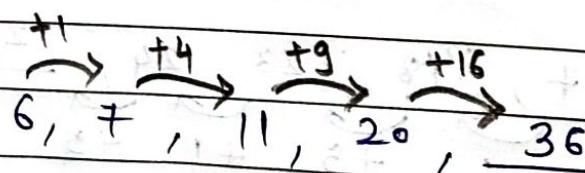
(8)

$$1, 5, 5, 9, 7, 11, 11, 15, 13, 17, \underline{\quad}$$



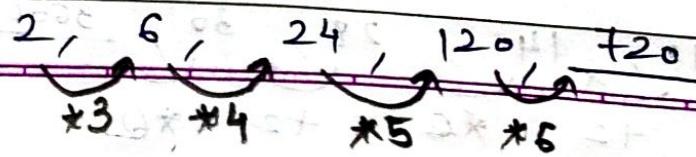
(9)

$$6, 7, 11, 20, \underline{\quad}$$



(10)

$$2, 6, 24, 120, \underline{\quad}$$



(11) $6, 12, 36, 144, \dots$

$$\rightarrow 6, 12, 36, 144, \frac{720}{+2 \quad +3 \quad +4 \quad +5}$$

(12) $31, 17, 48, 65, 113, \dots$

$$\rightarrow 31, 17, 48, 65, 113, \frac{178}{+31 \quad +17 \quad +48 \quad +65}$$

(13) $36, 49, 51, 39, 53, 54, 42, 57, 57, 45, \dots$

$$\rightarrow 36, 49, 51, 39, 53, 54, 42, 57, 57, 45, \frac{61}{+3 \quad +3 \quad +3 \quad +3 \quad +3 \quad +3 \quad +4 \quad +3 \quad +3 \quad +3} \frac{60}{+40 \quad +4 \quad +4}$$

(14) $0, 2, 8, 14, \dots, 34$

$$\rightarrow 0, 2, 8, 14, \frac{24}{\downarrow \quad \downarrow \quad \downarrow \quad \downarrow} 34$$

$$2^2 - 1 \quad 3^2 - 1 \quad 4^2 - 1 \quad 5^2 - 1 \quad 6^2 - 1$$

(15) 2, 15, 41, 80, 134 find Incorrect Number

→

$$\begin{array}{ccccccc} 2, & 15, & 41, & 80, & 134 & \times \\ \downarrow 9 & \downarrow 26 & \downarrow 39 & \downarrow 52 & & \end{array}$$

→ 134 is incorrect Number.

(16) 2, 6, 15, 40, 89,

→

$$\begin{array}{cccccc} 2, & 6, & 15, & 40, & 89, & 210 \\ \downarrow 4 & \downarrow 9 & \downarrow 25 & \downarrow 49 & \downarrow 121 & \end{array}$$

→ Square of Prime Number

(17) 0, 6, 24, 60, 120,

→

$$\begin{array}{cccccc} 0, & 6, & 24, & 60, & 120, & 210 \\ \downarrow 4 & \downarrow 18 & \downarrow 36 & \downarrow 60 & & \end{array}$$

$$\begin{aligned} \text{pattern} &= n^3 - n \quad (\text{n start from 1}) \\ &= 6^3 - 6 = 210 \end{aligned}$$

(18) 9, 31, 73, 141, 241,

→

$$9, 31, 73, 141, 241, \underline{379}$$

$$\begin{aligned} \text{pattern} &= n^3 + (n-1)^2 \quad (\text{n start from 2}) \\ &= 7^3 + 6^2 = 343 + 36 \\ &= \boxed{379} \end{aligned}$$

(19)

$0, 6, 24, 60, 120, 210, \underline{\quad}$

→

$0, 6, 24, 60, 120, 210, \underline{336}$

pattern = $n^3 - n$ (n starts from 1)

$$\text{Answer} = 7^3 - 7$$

$$= 343 - 7 = 336$$

→ Alphabet Series :-

1	2	3	4	5	6	7	8	9	10	11	12	13
A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N
26	25	24	23	22	21	20	19	18	17	16	15	14

Trick:- E :- 5

J :- 10

O :- 15

T :- 20

Y :- 25

(20)

Z, X, V, T, R, —, —

→

~~Z X V T R P N~~

face Value of Z = 26, face value of V = 22,
face Value of X = 24, face value of T = 20

(21) A, C, F, H, —, M

→

A, C, F, H, K, M
 ↑↑↑↑
 +2 +3 +2 +3 +2

face value of A = 1

face value of C = 3

face value of F = 6

(22) AZ, BY, CX, —

→

AZ, BY, CX, DW
 ↑↑↑
 +1 +1 +1

(opposite pairs)

(23) AZ, GT, MN, —, YB

→

AZ, GT, MN, SH, YB
 ↑↑↑↑
 +6 +6 +6 +6

face value of A = 1,

face value of G = 7,

face value of N = 13,

face value of S = 19,

face value of Y = 25

(24) A, Z, X, B, V, T, C, R, —, —

→

A, Z, X, B, V, T, C, R, P, Q
 +1 +1 +1
 -2 -2 -2 -2 -2 -2

(25) CE, GI, KN, OQ, —

→

CE, GI, KN, OQ, SU
 +2 +2 +2 +2 +2
 +2 +2 +2 +2 +2

(26) $A^D, E^H, I^L, N^P, \underline{U^X}$
 $\rightarrow \begin{array}{ccccccc} +3 & +3 & +3 & +3 & +3 & +3 \\ \sqcap & \sqcap & \sqcap & \sqcap & \sqcap & \sqcap \\ A^D, E^H, I^L, N^P, & \underline{Q^T}, & U^X \end{array}$
 $\quad \quad \quad +0 \quad +0 \quad +0 \quad +0 \quad +0 \quad +0$

(27) $A^B D^G, J^K N^P, T^U W^Z, E^F H^K, \underline{\quad}$
 $\rightarrow \begin{array}{ccccccc} +0+2+3 & +0+2+3 & +0+2+3 & +0+2+3 & +0+2+3 \\ \sqcap \sqcap \sqcap & \sqcap \sqcap \sqcap & \sqcap \sqcap \sqcap & \sqcap \sqcap \sqcap & \sqcap \sqcap \sqcap \\ A^B D^G, J^K N^P, T^U W^Z, E^F H^K, & \underline{Q^R T^W} \end{array}$
 $\quad \quad \quad +3 \quad +4 \quad +5 \quad +6$

(28) find Odd one out

- (a) KL132 (b) Q5136 (c) JP160 (d) NV308

\rightarrow $\begin{cases} FV \text{ of } K = 11, FV \text{ of } L = 12, KL 11 \times 12 = KL132, \\ Q 5 1 3 6 \checkmark \quad \begin{cases} FV \text{ of } J = 10, FV \text{ of } P = 15, JP 10 \times 15 = JP160, \\ FV \text{ of } N = 14, FV \text{ of } V = 22, NV 14 \times 22 = NV308, \\ FV \text{ of } Q = 17, FV \text{ of } S = 19, QS 17 \times 19 = QS323. \end{cases} \end{cases}$

* Coding - Decoding :-

(29) If MYSTIFY \rightarrow NZTUJ GZ then

NEMESIS \rightarrow (?)

OFNFTJT \rightarrow $\begin{cases} MYSTIFY \rightarrow NZTUJ GZ \\ (Hint: + face Value +1) \end{cases}$

(30) If SIKKIM \rightarrow THLJIL, then

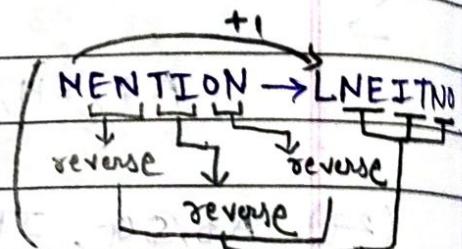
TRAINING \rightarrow (?)
UQBHOHOF

\rightarrow $\begin{cases} SIKKIM \rightarrow THLJIL \\ (-1, +1) \\ (Hint: +1, -1 face Value Alternative) \end{cases}$

(31) If MENTION → LNEITNO then
PATTERN → ?

answer:

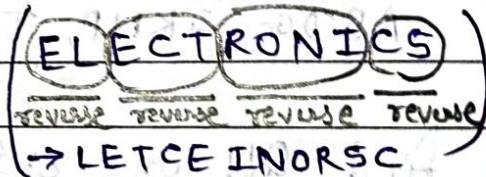
PATTERN → OTAETNR



(32) ELECTRONICS → LETCEINORS then
MANUFACTURE → (?)

answer:

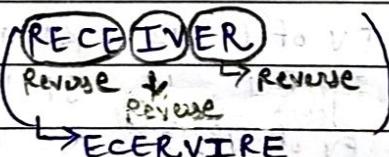
AMFUNUTCAER.



(33) RECEIVER → ECERVIRE then

COMPUTER → (?)

answer:

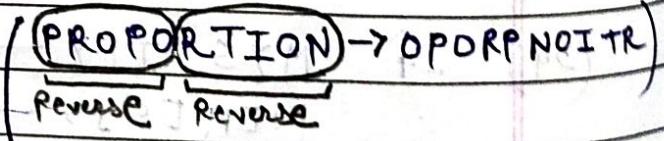


PHOTUTURE

(34) PROPORTION → OPORPNOITR then
POPULATION → (?)

answer:

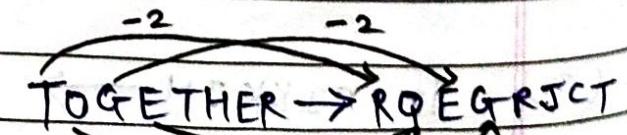
LUPONITA



(35) TOGETHER → RQEGRJCT then
PAROLE → (?)

answer:

NCPPJG

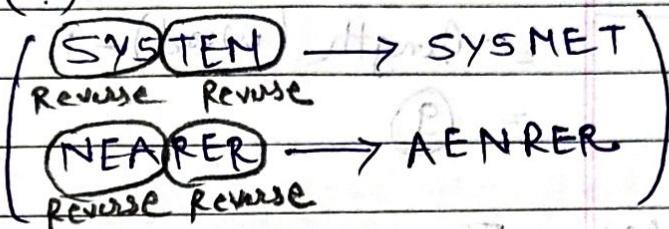


Hint: -2, +2 face value
Alternative.

- (36) If SYSTEM \rightarrow SYSMET
 NEARER \rightarrow AENRER
 FRACTION \rightarrow (?)

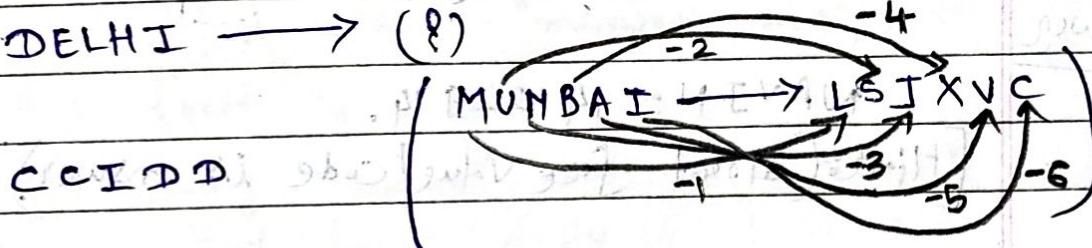
answer :-

CARFNOIT



- (37) If MUNBAI \rightarrow LSJXVC then,
 DELHI \rightarrow (?)

answer :-



- (38) NAMES \rightarrow TFNBOD then CRANE \rightarrow (?)

answer :-

CRANE \rightarrow ENARC \rightarrow FOBSD

- (39) MOBILITY \rightarrow 46293927 then

EXAMINATION \rightarrow (?)

answer :-

56149512965

Hint :- If face value is > 9
 then code is sum of
 their digits

- (40) If $EXT > 20$, BAT = 40, CAT = _____

answer :-

CAT = 60

$$\text{BAT} = 2 \times 1 \times 20 = 40$$

$$\text{CAT} = 3 \times 1 \times 20 = 60$$

(41) If REASON = 5, BELIEVE = 7,
GOVERNMENT = 873A ← 939A → 11

answer

$$= \text{length (word)} - 1$$

$$= 9$$

(42) If PRACTICE = 1518120116, then

$$\text{NAVIN} = ?$$

answer

$$\text{NAVIN} = 14122914.$$

[Hint: (direct face value / code is answer)]

(43) If MACHINE → 19-7-9-14-15-20-11 then

answer

$$\text{DANGER} \rightarrow 10-7-20-13-11-24$$

[Hint: New face value = face value + 6]

(44) If SILVER = 77, then, CHAPTER = ?

answer

1	2	3	4	5	6	7	8	9	10	11	12	13
A	B	C	D	E	F	G	H	I	J	K	L	M
26	25	24	23	22	21	20	19	18	17	16	15	14
1	2	3	4	5	6	7	8	9	10	11	12	13
Z	Y	X	W	V	U	T	S	R	Q	P	O	N
26	25	24	23	22	21	20	19	18	17	16	15	14

∴ SILVER = 77 (reverse face value of each letter)

$$\therefore \text{CHAPTER} = 24+19+26+11+7+22+9 \\ = 118$$

(45)

743: Mangoes are good

657: eat good food

934: mangoes are ripe

ripe = (?)

answer: -

ripe = g

Hint :- 743: mangoes are good
 934: mangoes are ripe
 we conclude that either 34 or 43
 code for "mangoes are", so for ripe
 $= g$.

(46)

479: fruit is sweet

248: very sweet voice

637: eat fruit daily

is = (?)

answer

: sweet = g (479: fruit is sweet, 248: very sweet voice): fruit = f (479: fruit is sweet, 637: eat fruit daily): is = g (479: fruit is sweet)

(47)

how are you: nee tim see

where are you: ble nee see

where = (?)

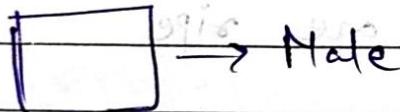
(a) nee (b) tim (c) see (d) None of these

where = ble

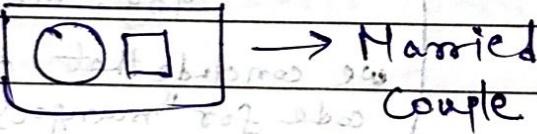
(then correct Answer is None of these)

How are you: nee \rightarrow tim seewhere are you: ble \rightarrow nee see

→ Blood Relations :-



○ → female



(48) Anil introduces Rohit as son of only brother of his father's wife. How Rohit related to Anil?

answer

cousins (2112101 801321)

(49) Pointing out to a photograph a man tells his friend, she is the daughter of only son of my father's wife.

answer:-

Daughter

(50) X introduces Y saying that he is the husband of grand daughter of father of my father. so How Y related to X?

answer

brother in law

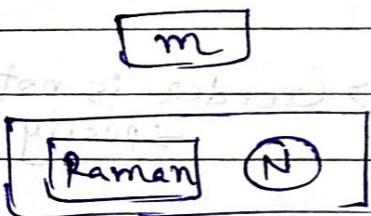
(51) Pointing to a man / a woman said his mother is only daughter of my mother, How is the woman related to man? \rightarrow mother-in-law (iii)

answer:

Mother

(52) If Neena says Anita's father Raman is the only son of my father-in-law Mahipal, then How is Bindu who is sister of Anita is related to Mahipal.

answer:

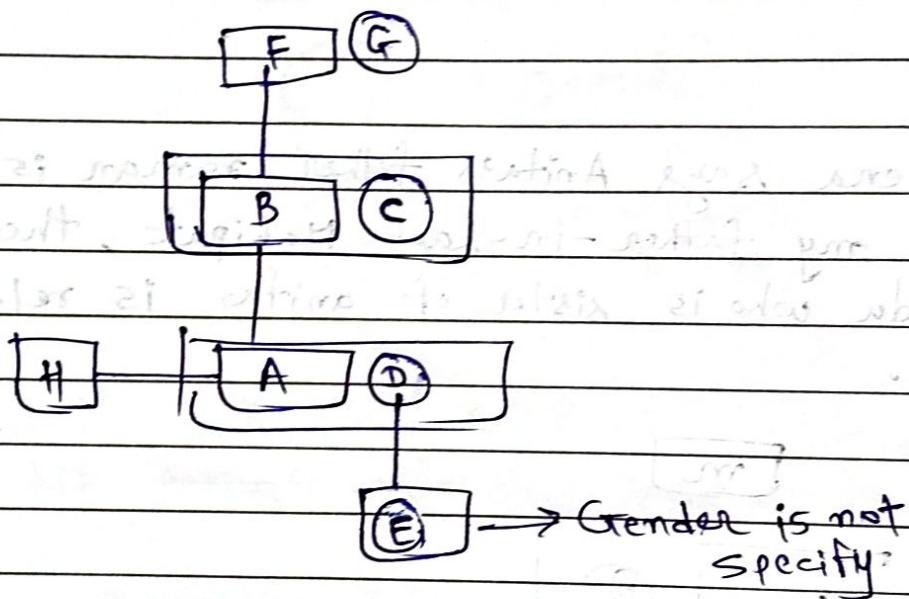


\rightarrow Grand daughter \rightarrow Grandson (iii)

- (53) A is son of B, but B is not mother of A.
C is married to B,
D is married to A,
E is child of D,
F is father of B,
G is married to F,
H is brother of A.

- (i) find relation of H to G.
 (ii) find relation of F to B.
 (iii) find relation of E to F.

answer:



(i) Grand Son

(ii) Father

(iii) Great Grand child

(54) The Number of males and female are equal in family of 6 members. A and E are sons of F. D is mother of two, one boy and one girl.

B is son of A, There is one married couple of family, which one of the following are true.

(a) A,B,C are females

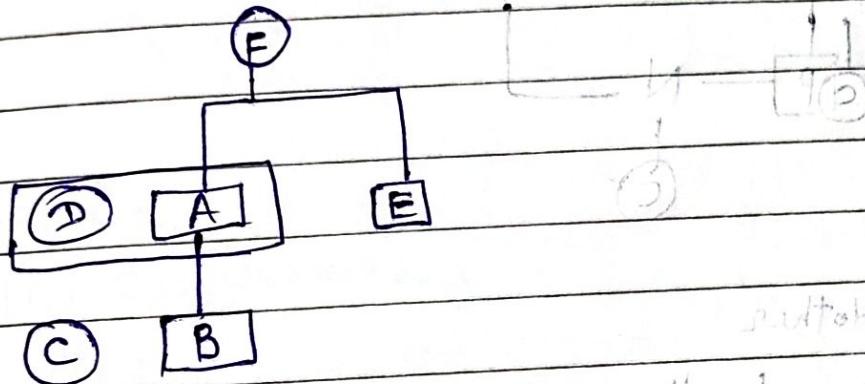
(b) A is Husband of D.

(c) D is granddaughter of F

(d) E and F are children of D

answer :-

→ Relation Tree :-



→ option B is correct.

(55) It is brother of L,

J is only son of R, who is husband of S, who is wife of W.

W is father-in-law of L,

D is maternal grandfather of P who is male,

Q is only son of W, to whom R is P

W is grandfather of N, being son of H

and C is daughter of N, being son of H

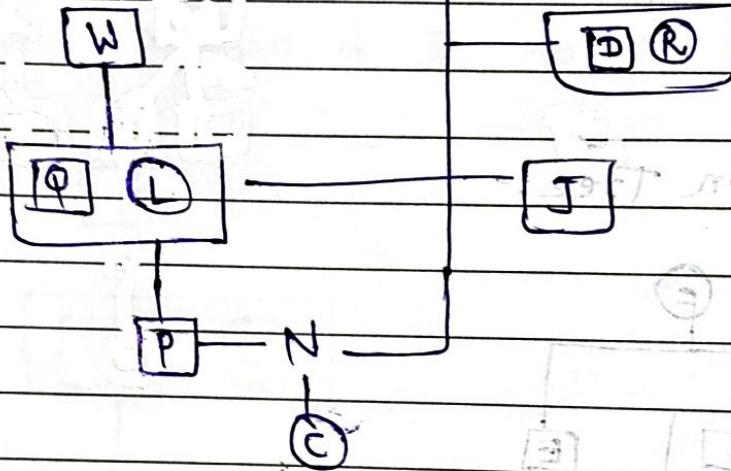
(i) find relation of L to C, and (ii)

(ii) find relation of P to N, D of H (iii)

answer :-

Paternal \rightarrow to wife of N \rightarrow Natural \approx (i)

\leftarrow to mother of son of N \rightarrow (ii)



(i) GrandMother

(ii) Son's brother

example K is daughter in law of G, To wife of N in T

N is father of L who is daughter in law of P,

H is brother in law of G & only son of F,

T is grandson of F,

H is unmarried,

G is male,

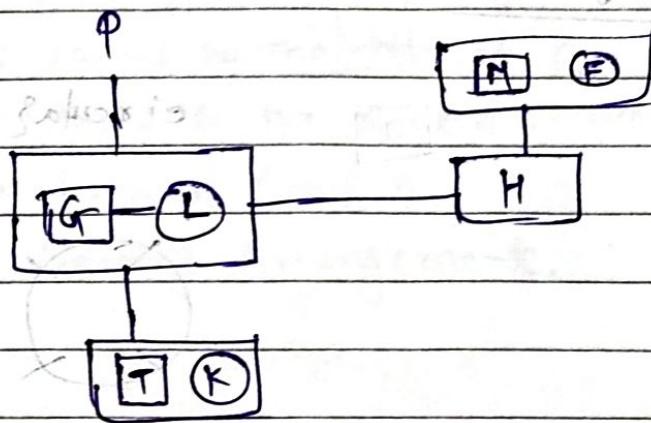
H has two childrens

find relation (i) N to G

(ii) K to L

(iii) Who is son of N.

anywpl:



(i) father-in-law \rightarrow is husband of (ii)

(ii) Daughter-in-Law \rightarrow wife of (iii)

(iii) H \rightarrow (i) (ii) brother (iii)

Example $A+B \rightarrow A$ is sister of B

$A-B \rightarrow A$ is brother of B

$A\times B \rightarrow H$ A is daughter of B

which relation shows E is maternal uncle of D ?

(a) $D\times F+E$ F is sister of son of E

(b) $D\times F-E$ F is son of son of E

(c) $D\times E+F$ F is son of son of E

(d) $D+F\times E$ F is son of son of E

anywpl:-

(a) $D\times F+E$ ✓

($F\times E = F$ is sister of E)

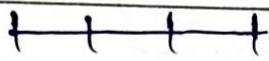
($D\times F+E = D$ is Daughter of F who is sister of E)

→ Seating Arrangement :-

Linear



circular



- (i) Number of Persons
- (ii) seating
- (iii) Directions (L-R) (R-L)

example 8 friends M, N, O, P, Q, R, S, T are seating in circular facing inwards.

→ P is third to the right of M, and second to left of S.

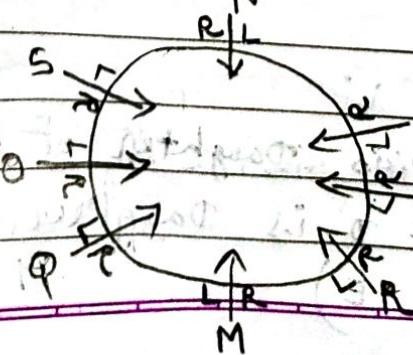
→ T is third to the left of S.

→ QS, QT, MN are not immediate neighbour.

→ O is second to the right of N.

draw Seating Arrangement

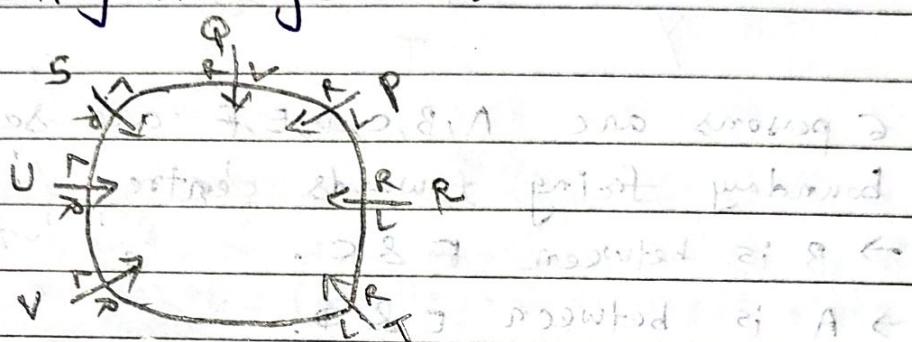
answer -



example

- P, Q, R, S, T, U, V, W are seating in circle facing towards centre.
- T is second to the left of P .
 - R is third to the right of U who is immediate left of V .
 - Q is between P and S .

Draw Seating Arrangement.

answer

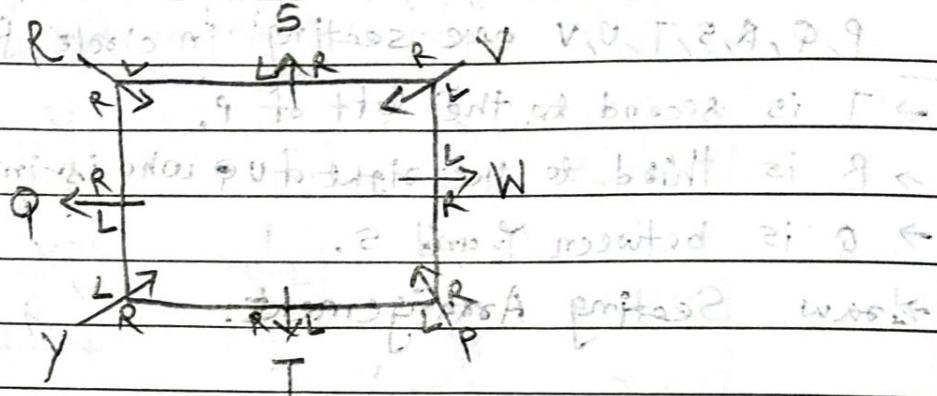
example 8 friends $P, Q, R, S, T, U, V, W, Y$ are seating around in square table. Out of 8, four persons seat at corner and 4 persons seat at mid point of each side.

- Persons at corner face and persons at mid outside facing centre.

- S is third to right of P .
- P is facing the centre.
- Y is not seating besides P or S .
- T is third to the right of R .
- R is not seating at mid points, R is also not beside Y .
- There is only one person between P and V .
- Q is not seating besides V .

Draw Seating Arrangement.

answer:



example

6 persons are A,B,C,D,E,F are seating in circular boundary facing towards centre.

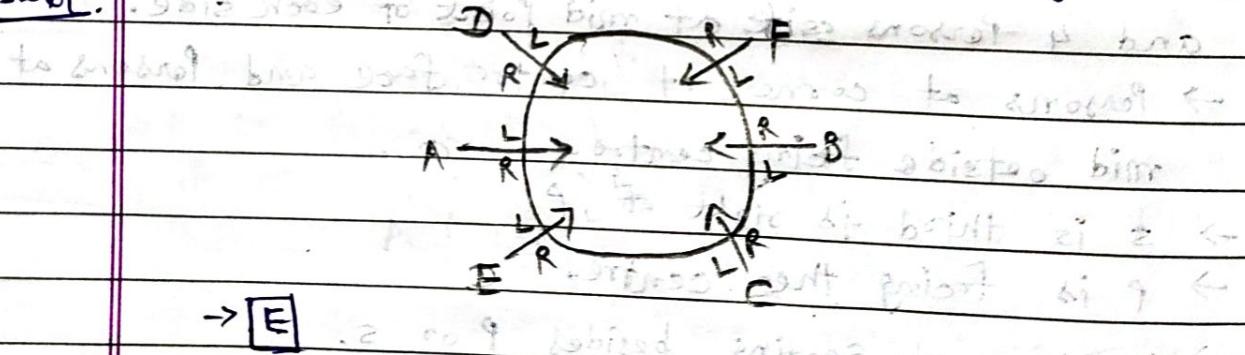
→ B is between F & C.

→ A is between E & D.

→ Who is second to the left of D?

→ Who is second to the right of A?

answer:



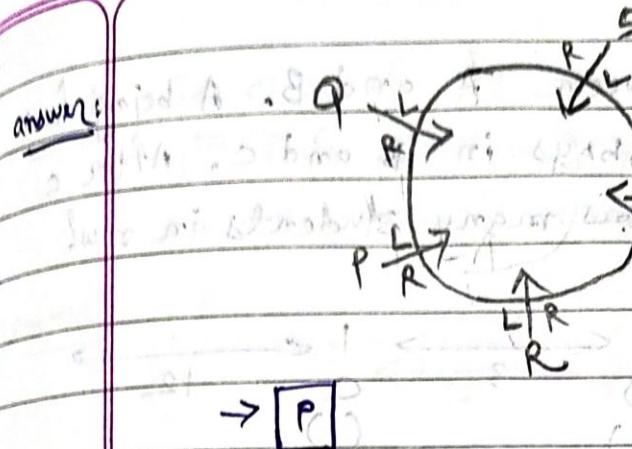
example P,Q,R,S,T are seating in circular table.

→ R is right of P and second to the left of S

→ T is not between Q and S.

Who is second to the left of T?

also draw Seating Arrangement.



Note:- If Not given in question then assume centre facing.

example In a line, Naresh is 18th from the left and 23rd from the right. So How many student in a line? (formula :- Number of people = (starting index + ending index - 1))

$$\text{Number of Students} = (\text{starting} + \text{ending} - 1)$$

$$= (23 + 18 - 1)$$

method :- 2

$$\text{Total} = \text{left} + \text{right} + 1 = \text{attribute}$$

$$22 + 17 + 1 = 40$$

It provides 3 positions = 3 people to see multiply

example Rank of A is 27th from Top and 39th from bottom then How many people in line?

$$\text{People} = (\text{Top} + \text{bottom} - 1) = (27 + 39 - 1) = 65$$

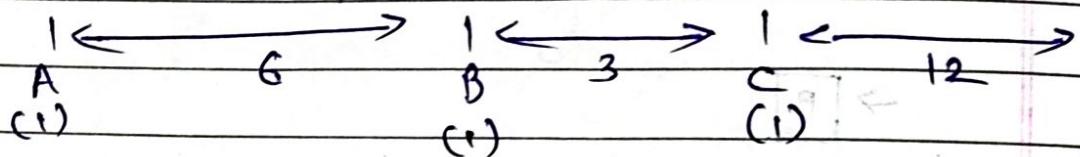
method :- 2 Top

$$\begin{array}{c} 26 \\ \rightarrow A(1) \\ 38 \end{array} \quad \text{people} = 26 + 1 + 38 = 65$$

Bottom

example There are 6 boys between A and B. A being first boy of row. There are 3 boys in B and C. After C there are 12 boys. So How many students in row?

answer:-

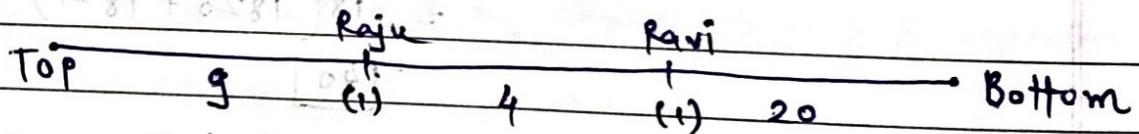


$$\text{Students} = 1 + 6 + 1 + 3 + 1 + 12$$

example Raju ranks 10th from Top and Ravi ranks 21st from bottom. If there are 4 students between them.

So How many student?

answer :-



$$\text{Students} = 9 + 1 + 4 + 1 + 20 = 35$$

example

In class of 45, Neha's Rank 15th from first. what is rank from last?

answer:

Number of people = starting pending - 1

$$\text{ending} = 31$$

example

In a class of 39 students. Kashish is 21st from right and Deepak is 23rd from left. How many student between them.

answer:-

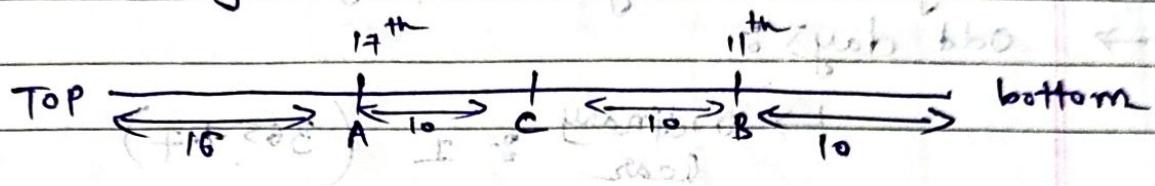
→ Kashish 21st from right,

→ Deepak is 23rd from left or $(39 - 23 + 1)$ from right

$$\rightarrow \text{Right } 16 \text{ Deepak} + + + \text{ Kashish left} = 3$$

example

In class of 49 students. A is 17th from top and B is 11th from bottom. C is exact middle of A and B.
So How many students in B and C.

answer :-

→ 10 students in B and C. easy now

Calender

→

Leap year = 366 days

(Coming after every 4 years)

→

Every 4th century is leap year.

→

Odd days :-

→ Ordinary :- 1 ($365 \div 7$)→ Leap year :- 2 ($366 \div 7$)Type:-example Today is Monday then after 100 days which day will come?answer :-

Day Code

Sun: 0

Mon: 1

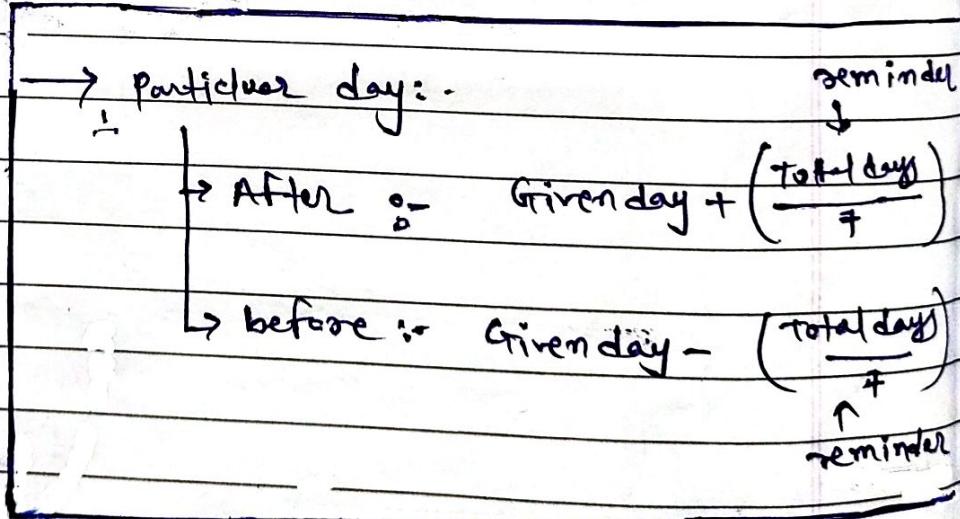
Tue: 2

Wed: -3

Thu: 4

Fri: 5

Sat: 6



$$\therefore = \text{Given day} + (\text{Total days}) \cdot 1 \cdot 7$$

$$= (1) + 100 \cdot 1 \cdot 7$$

(Monday Code)

$$= 1 + 2$$

$$= 3 \quad (\text{Wed. code})$$

= **Wed**

Any day for given date

Type :-

Month Code :-	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	0
	3	4	5	0	2	5	1	3	6	1	4	6	

Year Code :-

1500 - 1599	1600 - 1699	1700 - 1799	1800 - 1899	1900 - 1999
0	6	4	2	0

$$\text{Day} = \text{Reminder of } \left(\frac{\text{Date} + \text{M.C} + \text{Y.C} + (\text{Year}-1) + \text{L.P.}}{7} \right)$$

$$\left(\text{L.P.} = \frac{(\text{Year}-1)}{4} \right)$$

→ Let Today is 6th Nov 2023 then today is which day?

$$\text{Day} = \text{Reminder of } \left(\frac{06 + 4 + 6 + 22 + 5}{7} \right)$$

$$= 43 \cdot 1 \cdot 7 = 1 \quad (1 \text{ is Monday's code})$$

Day = Monday

Note:- If Year is leap year and date $> 29^{\text{th}}$ Feb
 then leap year is ($L.P. = (year - 1)/7 + 1$).

~~Type 3~~ Same calendar Year :-

↳ for leap year :- Add 28 to the given year.

↳ for Non-leap year :-

→ Let consider year 2003 .

(→ So write before and after leap year and between them years.)

L.P.	Active Year	L.P.
→ 2000 - 2013	↓	2004
2000 2001 2002 2003 2004	↓	
X 6 11 11 X		

($6, 11, 11$ code is same).

∴ $2003 + 11 = 2014$ is same calendar year.

example 15^{th} March 2003 is Saturday, find day on 23 Jan 2005 ?

answer:-

$$2003 \rightarrow 1 + 2 + 3 + 2 + 3 + 3 + 2 + 3 + 2 + 3 = 39$$

$$2004 \rightarrow 2 \quad (\text{odd day of leap year is } 2)$$

$$2005 \rightarrow 23$$

$$\frac{64}{64}$$

$$\rightarrow 64 \cdot 1 \cdot 7 = \boxed{1}$$

Date
1st Dec

∴ so answer = (given day) + 1

∴ 529 mod 7 = Saturday + 1

= [Sunday]

example 18 Feb 1996 → wed

15 July 2000 → (?)

answer

1996 → $31+28 = 2$ (31 is total days remaining in 1996.)

1997 → 1 (odd day for a Non leap year)

1998 → 1 (odd day for a Non leap year)

1999 → 1 + (odd day for a Non leap year)

2000 → $31+29+31+30+31+30+15$ (Total days before ≤ 15 July 2000)
 $= 3+1+3+2+3+2+1$ $= 15 \div 7 = 2$ = 2nd day of month

answer = (wed) + 2

 $= 3+2$ $= 5 \div 7$ $= 2$

→ Tuesday

(2 is code for Tuesday)

Date: 1st Dec, A.D.

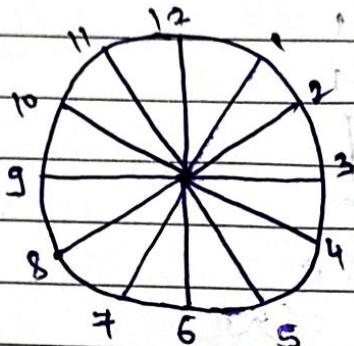
1000 - (7) = 3

1000 - (11 - 2) = 9

CLOCK

Page No.

Date:



\rightarrow (per hour) = 30° per hour

\rightarrow Hour hand: 3° per hour

OR

30° per 60 mins

\rightarrow Minute hand: 6° per min

360° per hour

example

At 4:20 pm, How much difference in degree of Hour hand and Minute Hand

answer

\rightarrow Hour hand: $(30 \times 4) + \left(\frac{30 \times 20}{60}\right)$ $\left(30^\circ \text{ per hour}\right)$
 Calculating How much Hour hand is displaced

or
 30° per 60 mins

$$120 + 10 = 130^\circ$$

\rightarrow Minute hand = 20×6 \rightarrow 120° $\left(6^\circ \text{ per min}\right)$
 Calculating How much Minute hand displayed

$$\rightarrow \text{difference} = 130^\circ - 120^\circ$$

$$= \boxed{10}$$

formula: $\theta = |30H - \frac{11}{2}N|$

example: 4:20

$$H = 4, N = 20$$

$$\theta = |30(4) - \frac{11}{2}(20)|$$

$$\theta = |120 - 110| = \boxed{10^\circ}$$

- perpendicular = orthogonal = 90°
- coincides = meet = overlap = 0°
- opposite = straight line = 180°

example At what time between 7 and 8, the two hands of a watch meets.

(A) 7:35

(B) 7:36.99

(C) 7:38.18

(D) 7:42.6

answer :- Let min θ be \angle between hands

$\therefore \theta = 0^\circ$

$\angle (30H - \frac{11}{2}M) = 0^\circ$

$30H - \frac{11}{2}M = 0^\circ$

$30H - \frac{11}{2}M = 0^\circ$

(H = 7)

∴ $30(7) - \frac{11}{2}M = 0^\circ$ (min. between hands)

$210 - \frac{11}{2}M = 0^\circ$ (min. between hands)

$\therefore 210 = \frac{11}{2}M$

$(\text{min. between hands})^2$

$\therefore \frac{420}{11} = M$

$M \approx 38.18 \text{ mins}$

Answer :- 7:38.18

formula :- Reflex Angle = $360^\circ - \theta$

(where, $\theta = |30H - \frac{11}{2}M|$)

(min. SF. 6 digits)

example In 15 Mins, The minute hand gains over Hour hand by ?
 (A) 16° (B) 18° (C) 80° (D) 88°

answer :-

method :- 1

$$\theta = \left| 30H - \frac{11}{2}N \right|$$

$$(H=0, N=16)$$

$$\theta = \left| 30(0) - \frac{11}{2}(16) \right|$$

$$\theta = (11)(8)$$

$$\boxed{\theta = 88^\circ}$$

method :- 2

In 1 Minutes,

Hour hand = 0.5°

Minute hand = 6°

In 15 Minutes

Hour hand = $0.5 \times 15 = 8^\circ$

Minute hand = $6 \times 15 = 90^\circ$

$$\text{difference} = 90^\circ - 8^\circ = \boxed{88^\circ}$$

example At what time, between 3 and 4 o'clock, the minute hand is $\frac{7}{11}$ Minutes ahead of Hour hand.

answer :-

$\rightarrow 1$ Minutes = 6° degree (for Minute hand)

$\frac{7}{11}$ Minutes = (?)

$\boxed{= 42^\circ}$ (means minutes hand 42° ahead of Hour hand)

$$\therefore \theta = \left| 30(H) - \frac{11}{2}(N) \right|$$

$$42 = 30(3) - \frac{11}{2}(N) \quad \text{or} \quad -42 = 30(3) - \frac{11}{2}(N)$$

$$\therefore \frac{11}{2}(N) = 90 - 42$$

$$N = 48 \times 2 / 11$$

$$\boxed{N = 29 \text{ min}}$$

$$\boxed{N = 8.72 \text{ mins}}$$

correct $\rightarrow (3 : 24)$
 $(3 : 8.72$ is not in option)

example At what time, between 3 and 4 o'clock, the minute hand and Hour hand in straight line.

answer

\therefore for straight line $\Theta = 180^\circ$

$$\therefore \Theta = |30(H) - \frac{11}{2}(N)|$$

$$\therefore 180^\circ = |30(3) - \frac{11}{2}(N)|$$

$$180 = 90 - \frac{11}{2}(N) \quad \text{or} \quad -180 = 90 - \frac{11}{2}(N)$$

$$\frac{11}{2}(N) = -90$$

X

$$\frac{11}{2}(N) = 270$$

$$N = 49\left(\frac{1}{11}\right)$$

$\therefore [3 : 49\left(\frac{1}{11}\right)] \rightarrow$ Answer

example At what time, between 3 and 4 o'clock, the minute hand and Hour hand in straight line but not opposite to each other.

answer $\because \Theta = 0^\circ$ (overlap condition)

$$\therefore \Theta = |30(H) - \frac{11}{2}(N)|$$

$$\therefore 30H = \frac{11}{2}(N)$$

$$\therefore 30(3) = \frac{11}{2}(N)$$

$$N = 16\left(\frac{4}{11}\right)$$

answer :- $3 : 16 \left(\frac{4}{11} \right) : 8$

(ratio in lowest term)

Q17. A book is bought, with total for
book & binding is Rs. 100. If book cost is

Rs. 81, then book cost is

$$\left(\text{H} \right) \frac{11}{2} - (\text{E}) = 81 ;$$

$$\left(\text{H} \right) \frac{11}{2} - (\text{E}) = 81 ;$$

$$\left(\text{H} \right) \frac{11}{2} - \text{OP} = 81 ;$$

$$\left(\text{H} \right) \frac{11}{2} - \text{OP} = 81 ;$$

$$\text{OP} = \left(\text{H} \right) \frac{11}{2}$$

$$\text{OP} = \left(\text{H} \right) \frac{11}{2}$$

$$\left(\text{H} \right) \text{PP} = 19$$

Ans. $\left(\text{H} \right) \text{PP} : \text{E} \right] :$

Q18. A book is bought, with total for
book & binding is Rs. 100. If book cost is

Rs. 81, then book cost is

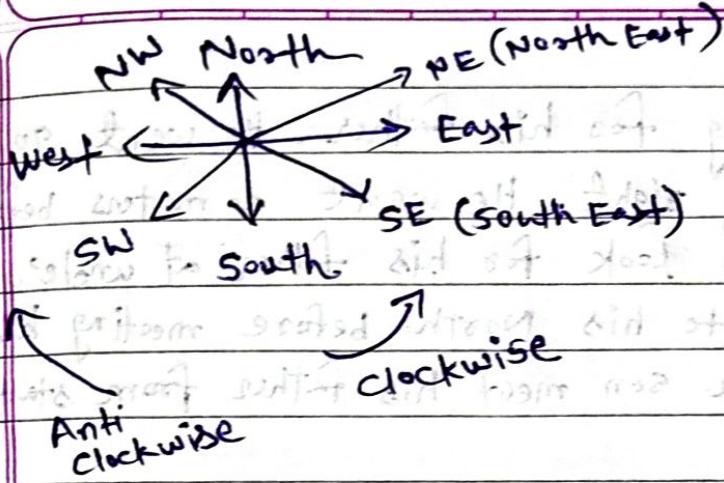
$$\left(\text{H} \right) \frac{11}{2} - (\text{E}) = 81 ;$$

$$\left(\text{H} \right) \frac{11}{2} - \text{OP} = 81 ;$$

$$\left(\text{H} \right) \frac{11}{2} = \text{H} + \text{E}$$

$$\left(\text{H} \right) \text{OP} = \text{H}$$

$$\left(\text{H} \right) \frac{11}{2} = (\text{E}) + \text{OP}$$

Direction

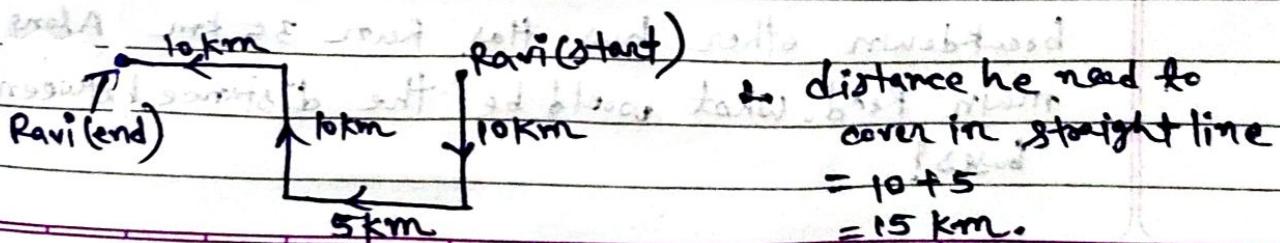
example A man is facing west. He turns 45° degree in clockwise direction then another 180° in same direction and 270° in anticlockwise in which direction he is facing now?

answer

$$\begin{array}{c}
 \text{N} \\
 \uparrow \\
 \text{E} \\
 \rightarrow \\
 \text{S} \\
 \downarrow \\
 \text{W} \\
 \leftarrow \\
 45^\circ
 \end{array}
 \begin{array}{l}
 \text{anticlockwise} \\
 \downarrow \\
 = 270 - (180 + 45^\circ) \\
 = 45^\circ \text{ (Anticlockwise)} \\
 = \boxed{SW}
 \end{array}$$

example Ravi left home, and cycled 10 km southwards and then turned right and cycled 5 km . Again turned right and cycled 10 km and turned left and cycled 10 km . How many km. will he have to cycle to reach his home straight?

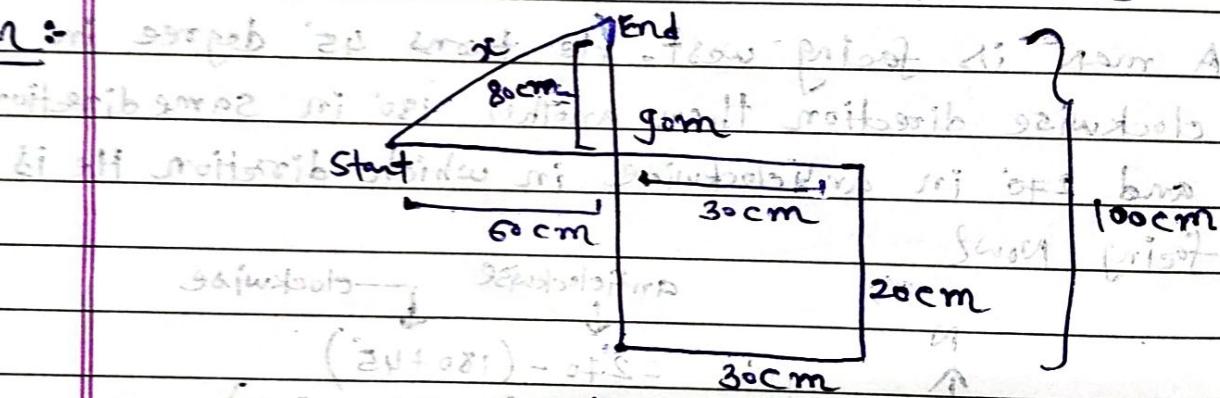
answer



example A child is looking for his father. He went 90 meter East before turning right. He went 20 meters before turning right to look for his father at uncle's place 30 meter. 100 m to his North before meeting his father in street. How far son meet his father from starting point?

- (A) 18 m (B) 140 m (C) 100 m (D) 260 m

answer :

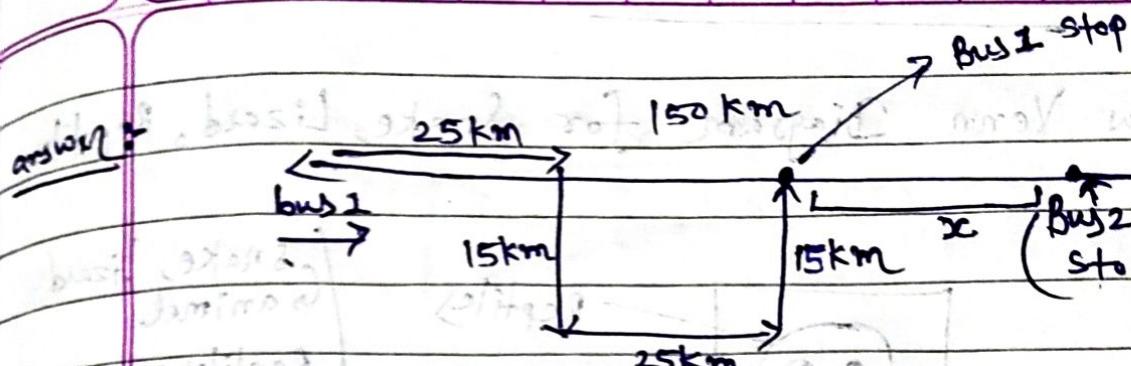


$x = \text{child far from starting point} \rightarrow 100$

$$x = \sqrt{80^2 + 60^2}$$

$$x = 100 \text{ m}$$

example Two buses start from opposite points of main road 150 km apart. The ^{1st} bus 25 km and take a right turn then runs 15 km, then turns left 25 km, then takes direction to back Main road. Due to minor breakdown other bus has run 35 km along the main road. What would be the distance between two buses?



→ x is our Answer.

$$\rightarrow x = 150 - (25 + 25 + 35) \quad \left(\begin{array}{l} \text{Total distance - distance} \\ \text{travelled by} \\ \text{buses} \end{array} \right)$$

$$x = 65 \text{ km}$$

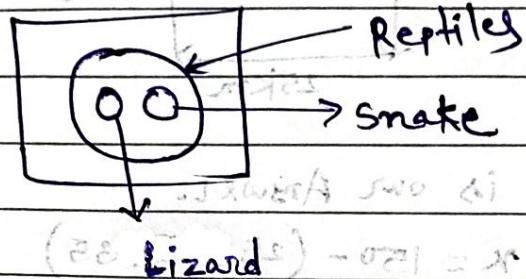
Venn Diagram

example

Draw Venn Diagram for Snake, Lizard, Reptiles.

answer:-

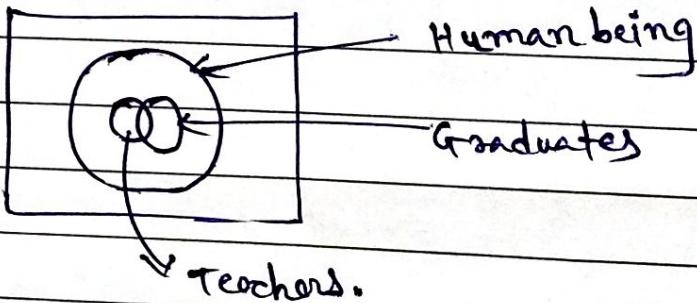
(Lizard cannot be
Snake and snake
cannot be
Lizard)



{ Snake, Lizard
Animal
Reptiles means
category of animal
which can crawl.

example

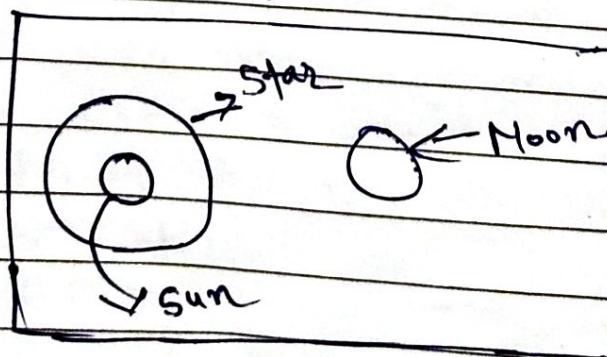
Human being, Teachers & Graduates.

answer:-

→ All Graduates and Teachers are Human being.
→ but All teachers are not Graduates and All graduates
are not teachers.

example

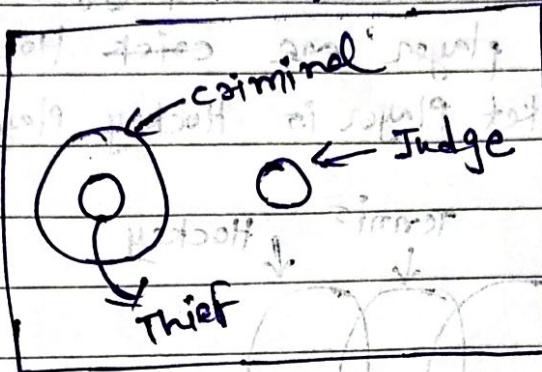
Sun, Moon, Star, draw Venn diagram.

answer:-

→ Sun is also a star.

example Judge, Criminal, Thief, draw Venn diagram.

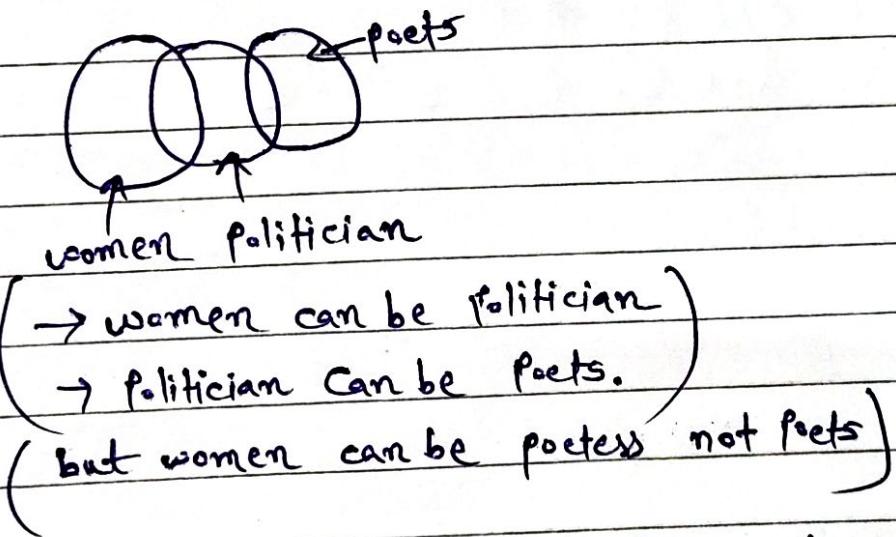
answer :-



(Thief is one type of criminal) (All thief is criminal but All criminal is not thief).

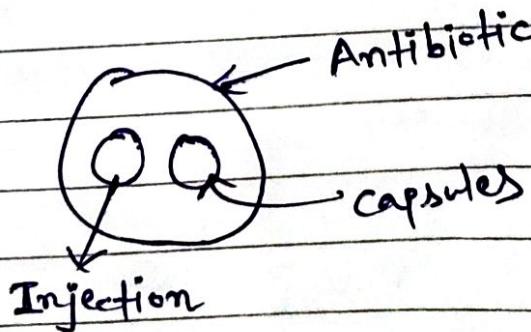
example Politician, Poets, women, draw Venn diagram.

answer :-



example Capsules, Antibiotic and injection, draw Venn diagram

answer :-



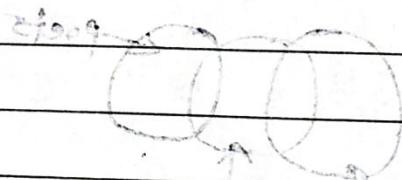
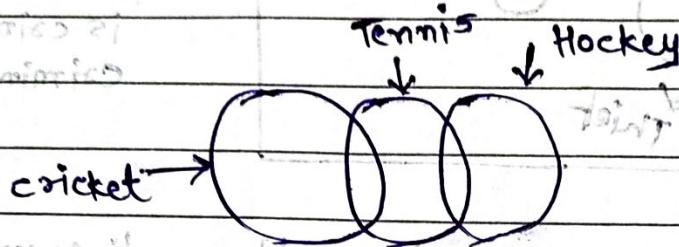
example

Some of player are tennis player.

Some tennis player are Hockey player.

To get No cricket player is Hockey player, draw Venn diagram

answer



Intersection

(Intersection of two sets)

(Intersection of two sets)

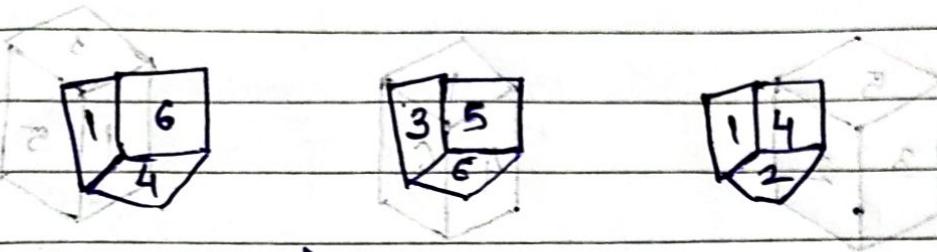
(Intersection of two sets)

Intersection

Intersection



Intersection

Diceexample

find opposite of 2

answer-

→ for first two cubes:-

(start from same Number and write in clockwise)

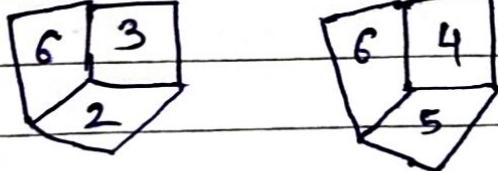


6, 4, 1

6, 3, 5 (reading from most front)

Means, 4, 3 are opposite to each other.

→ so we can say opposite of 2 is 6.

example

: find Opposite of 5 or find bottom if Top is 5.

answer-→ Start from Same Number and write in clockwise
(same number in both dice is 6)

for dice:-1, 6, 3, 2

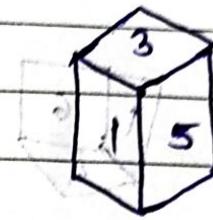
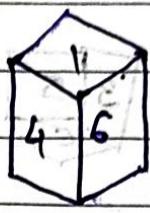
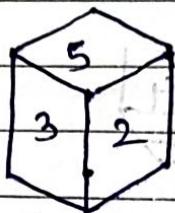
for dice:-2, 6, 4, 5

means, 3 and 4 opposite to each other.

5 and 2 opposite to each other.

answer:- 2

example



→ To Chicago bus.

(Opposite numbers are always written vertically around each face.)

find Opposite of one or find bottom if top is one.

answer

(write from same number)

∴ for dice 2:- 1, 6, 4 In this case 5 Number
for dice 3:- 1, 3, 5 is covered so we can say
6, 3 are opposite to each
other, and 4 and 5 are
opposite to each other.
→ 5°, opposite to 1 is [2].



∴ if you will write bus no. → 2 to Chicago bus.

(Opposite numbers are always written vertically around each face.)

→ 6, 3 are opposite to each other.

→ 2, 5 are opposite to each other.

∴ The bus no. of Chicago plane is 6, 3
and the bus no. of Chicago is 2, 5.

[2] - centre