

# LOGICAL REASONING NOTES

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## PUZZLES

①  $22 + 4 = 24$   
 $13 + 6 = 16$   
 $80 + 2 = 82$   
 $67 + 9 = ??$

Ans. 69

(one's digit gets replaced)

②

4	8	16
5	10	20
6	12	??

Ans. 24

$$4 \times 2 = 8 \quad 8 \times 2 = 16$$

$$5 \times 2 = 10 \quad 10 \times 2 = 20$$

$$\therefore 6 \times 2 = 12 \quad \& \quad 12 \times 2 = 24$$

③  $1 + 4 = 5$

$2 + 5 = 12$

$3 + 6 = 21$

$8 + 11 = ??$

Ans.  $(1 \times 4) + 1 = 5$

$(5 \times 2) + 2 = 12$

$(3 \times 6) + 3 = 21$

$(8 \times 11) + 8 = 96$

$\therefore \text{Ans} = 96$

other approach  
but different ans.

$1 + 4 = 5$

$5 + 2 + 5 = 12$

$12 + 3 + 6 = 21$

$21 + 8 + 11$

$= 40$

④ Using 8 8 8 8 8 8 8 bring 1000.

$$\begin{array}{r} 8 \\ 8 \\ 8 \\ 8 \\ 8 \\ 8 \\ 8 \\ \hline 1000 \end{array}$$

⑥  $1111 = R$   
 $2222 = T$   
 $3333 = E$   
 $4444 = N$   
 $5555 = ??$

Soln:  
 $1+1+1+1 = \text{FOUR}$   
 $2+2+2+2 = \text{EIGHT}$   
 $3+3+3+3 = \text{TWELVE}$   
 $4+4+4+4 = \text{SIXTEEN}$   
 $5+5+5+5 = \text{TWENTY}$

Ans = Y

⑤ ONE = 314  
TWO = 325  
THREE = 538  
FOUR = 448  
FIVE = ??

Soln:  
ONE  
No. of letters = 3  
One  $\rightarrow$  1  
 $1+3=4$   
 $\therefore \text{ONE} = 314$

TWO  
No. of letters = 3  
 $\underline{\underline{3}} - -$   
Two  $\rightarrow$  2  
 $\underline{\underline{3}} \underline{2} - -$   
 $3+2=5$   
 $\underline{\underline{3}} \underline{2} 5 - -$

FOUR  
No. of letters = 4  
 $4 \rightarrow 4$   
 $4+4=8$   
 $\underline{\underline{4}} \underline{4} 8 - -$

SIX

369 ANS

⑦  $8+2 = 16106$   
 $5+4 = 2091$   
 $9+6 = 54153$   
 $13+7 = ??$

Soln:  
multiplication  
 $\begin{array}{r} \uparrow \downarrow \downarrow \\ \underline{\underline{-}} \quad \underline{\underline{-}} \quad \underline{\underline{-}} \end{array}$  Add " Subtraction

$$8+2 = \underline{\underline{8*2}} \quad \underline{\underline{8+2}} \quad \underline{\underline{8-2}}$$

$$= 16106$$

$5+4 = 5 \times 4 \quad 5+4 \quad 5-4$   
2091

$13+7 = 13 \times 7 \quad 13+7 \quad 13-7$

91206

Ans

$$\textcircled{8} \quad 4+4=20$$

$$5+5=30$$

$$6+6=42$$

$$7+7=56$$

$$9+9=??$$

Soln:

$$(4 \times 4) + 4 = 20$$

$$(5 \times 5) + 5 = 30$$

$$(6 \times 6) + 6 = 42$$

$$(7 \times 7) + 7 = 56$$

$$\therefore (9 \times 9) + 9 = 90$$

Ans

$$\textcircled{9} \quad \text{January} = 71313$$

$$\text{February} = 82382$$

$$\text{March} = 53113$$

$$\text{April} = 54203$$

$$\text{May} = 35112$$

$$\text{June} = ?$$

Soln: January

$$\text{No. of alphabets} = 7$$

$$\underline{7} \quad \underline{\quad} \quad \underline{\quad}$$

1<sup>st</sup> month

$$\Rightarrow \underline{7} \underline{1} \underline{\quad} \underline{\quad}$$

$$\text{No. of vowels} = 3 \\ (\text{repetition allowed})$$

$$\underline{7} \underline{1} \underline{3} \\ \underline{\quad} \underline{\quad} \underline{\quad}$$

$$\text{No. of days} = 31 \\ (\text{reverse} = 13)$$

$$\underline{7} \underline{1} \underline{3} \underline{1} \underline{3}$$

∴ JUNE

$$\begin{array}{r} 46203 \\ - - - \\ \hline \end{array}$$

July & Aug  
both have 31 days

$$\textcircled{12} \quad 1 = 3$$

$$2 = 3$$

$$3 = 5$$

$$4 = 4$$

$$5 = 4$$

$$\textcircled{10} \quad \text{Monday} = 617$$

$$\text{Then } 6 = ??$$

$$\text{Tuesday} = 729$$

$$\text{Wednesday} = 9312$$

|

$$\text{Sunday} = ???$$

Soln: Monday

$$1 = \text{ONE} = 3 \quad (\text{No. of letters})$$

$$\text{TWO} = 3$$

$$\text{THREE} = 5$$

$$\text{SIX} = 3 \quad \underline{\text{ans}}$$

$$\text{No. of letters} = 6$$

$$1^{\text{st}} \text{ day} = 1$$

$$1+6 = 7$$

$$\therefore \text{Monday} = 617$$

Sunday

$$= 6713$$

ans

(13)



Soln:

$$\frac{4+2}{2} = 3$$

(11)

$$\begin{array}{|c|c|c|c|c|c|} \hline 16 & 06 & 68 & 88 & ? & 98 \\ \hline \end{array}$$

$$\frac{5+3+1+1}{2} = 5$$

$$\downarrow \\ 5180^\circ$$

$$\therefore \frac{9+3}{2} = 6 \quad \underline{\text{ans}}$$

$$\begin{array}{|c|c|c|c|c|c|} \hline 86 & 22 & 88 & 89 & 90 & 91 \\ \hline \end{array}$$

(14) \*

$$\begin{array}{|c|c|} \hline G & P \\ \hline 2 & 3 \\ \hline S & I \\ \hline 2 & 8 \\ \hline Q & E \\ \hline 2 & ?? \\ \hline \end{array}$$

$$\text{Ans} = 84$$

Sol<sup>n</sup>: Acc to  
alphanumeric positions

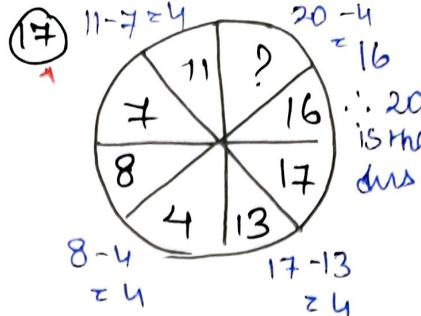
$$G = 7 \quad P = 16$$

$$7 + 16 = 23$$

$$S = 19 \quad I = 9$$

$$19 + 9 = 28$$

$$\therefore Q + E = 17 + 5 \\ = 22 \text{ ans.}$$

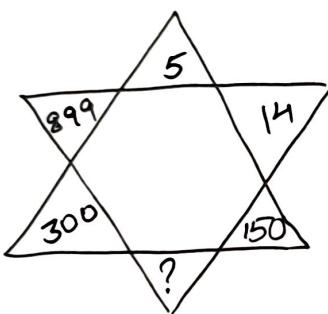


$$20 = \underline{\text{ans}}$$

or

$$\left. \begin{array}{l} 11 + 13 = 24 \\ 16 + 8 = 24 \\ 17 + 7 = 24 \\ 4 + ? = 24 \end{array} \right\} \begin{array}{l} \text{adding oppositely} \\ \text{connected member} \\ (\text{Sum} = 24) \end{array}$$

$\rightarrow 20$  is the  
ans.

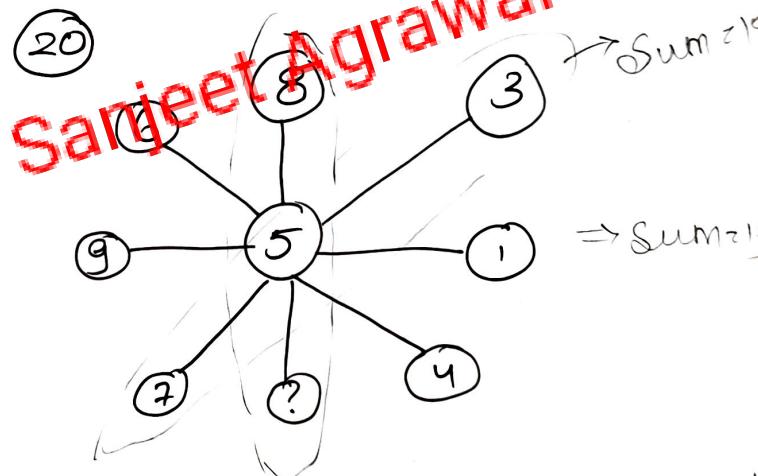


Sol<sup>n</sup>:

$$5 \times 300 = 15 - 1 = 14 \\ (300 \times 3) - 1 = 899$$

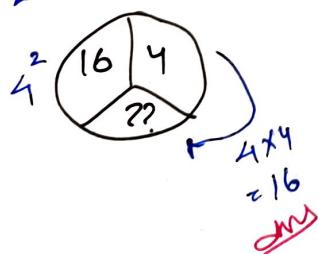
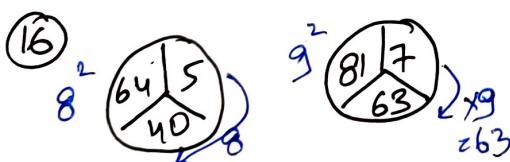
$$(150 \times 3) - 1 = 449$$

ans



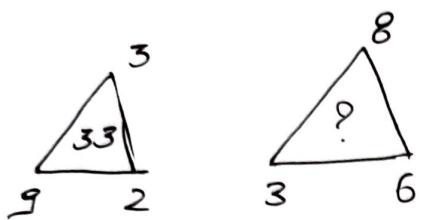
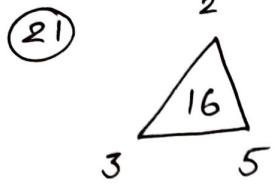
sum = 15 (after adding all elements in a line)

$$\therefore 8 + 5 + x = 15 \\ x = 2 \text{ ans}$$



(17)



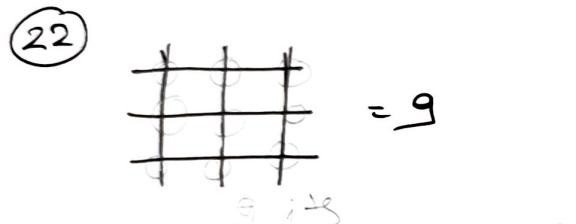


Sol<sup>n</sup>:  $3 \times 5$

$$(3+5) \times 2 = 16$$

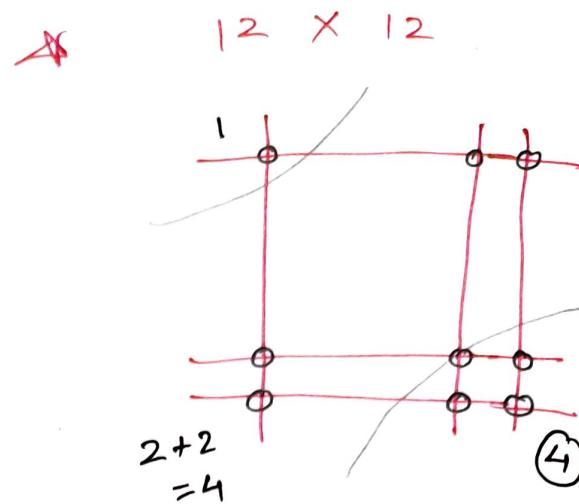
$$(1+7) \times 5 = 40$$

$$\therefore (3+6) \times 8 = 72 \text{ Ans}$$



Sol<sup>n</sup> = No. of j's.

$$\text{Ans} = 4$$



$$3 \times 4$$



(23)

$$AT = 4$$

$$2 \times 2$$

$$CAT = 6$$

$$3 \times 2$$

$$CROW = 8$$

$$4 \times 2$$

$$BRAIN = 10$$

$$5 \times 2$$

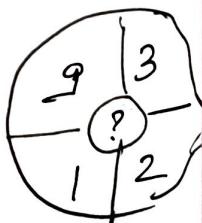
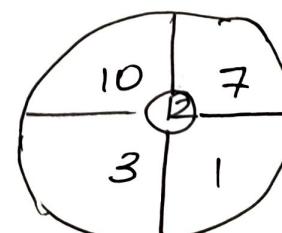
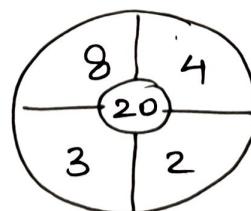
(No. of letters)

$$TWISTER = 8$$

$$= 7 \times 2$$

$$= 14$$

(24)



$$8 - 4 = 4$$

$$3 + 2 = 5$$

$$4 \times 5 = 20$$

$$10 - 7 = 3$$

$$3 + 1 = 4$$

$$3 \times 4 = 12$$

$$9 - 3 = 6$$

$$1 + 2 = 3$$

$$6 \times 3 = 18$$

Ans

(25)

$$5 + 3 + 2 = 15 \text{ } 0 \text{ } 22$$

$$9 + 2 + 4 = 18 \text{ } 36 \text{ } 52$$

$$8 + 6 + 3 = 48 \text{ } 24 \text{ } 66$$

Then,

$$7 + 2 + 5 = ??$$

Soln:  $5 \times 3 = 15$

$$\begin{array}{r} 15 \\ - \\ \hline \end{array}$$

$$5 \times 2 = 10$$

$$\begin{array}{r} 15 \ 10 \\ - \ - \\ \hline \end{array}$$

$$(5 \times 3) + (5 \times 2) - 3(\text{middle})$$

$$\begin{array}{r} 15 \ 10 \ 22 \\ - \ - \ - \\ \hline \end{array}$$

$$9 \times 2 = 18$$

$$\begin{array}{r} 18 \\ - \\ \hline \end{array}$$

$$9 \times 4 = 36$$

$$\begin{array}{r} 18 \ 36 \\ - \ - \\ \hline \end{array}$$

$$18 + 36 - 2$$

$$54 - 2 = 52$$

∴

$$7 \times 2 = 14$$

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

$$7 \times 5 = 35$$

$$\begin{array}{r} 14 \ 35 \\ - \ - \\ \hline \end{array}$$

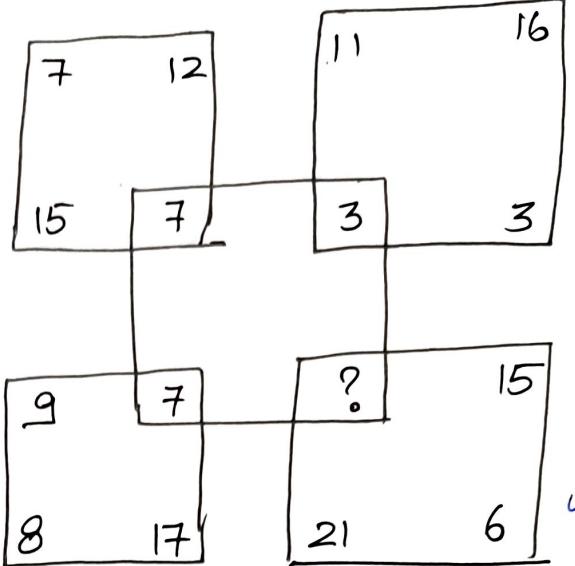
$$14 + 35 - 2$$

$$= 49 - 2 = 47$$

$$\begin{array}{r} 14 \ 35 \ 47 \\ - \ - \ - \\ \hline \end{array}$$

Ans

(26)



Soln:

$$1^{\text{st}} \text{ block} \Rightarrow 7 + 12 + 15 = 34$$

$$3 + 4 = 7$$

$$2^{\text{nd}} \text{ block} \Rightarrow 11 + 16 + 3 = 30$$

$$3 + 0 = 3$$

$$3^{\text{rd}} \text{ block} \Rightarrow 9 + 8 + 17 = 34$$

$$3 + 4 = 7$$

$$4^{\text{th}} \Rightarrow 15 + 21 + 6 = 42$$

$$4 + 2 = 6 \text{ } \underline{\text{Ans}}$$

27\*

$$\div 3 = 4$$

12

$$4 \times 6 = 24$$

$$18 \div 3 = 6$$

$$\div 3 = 3$$

21

$$3 \times 10 = 30$$

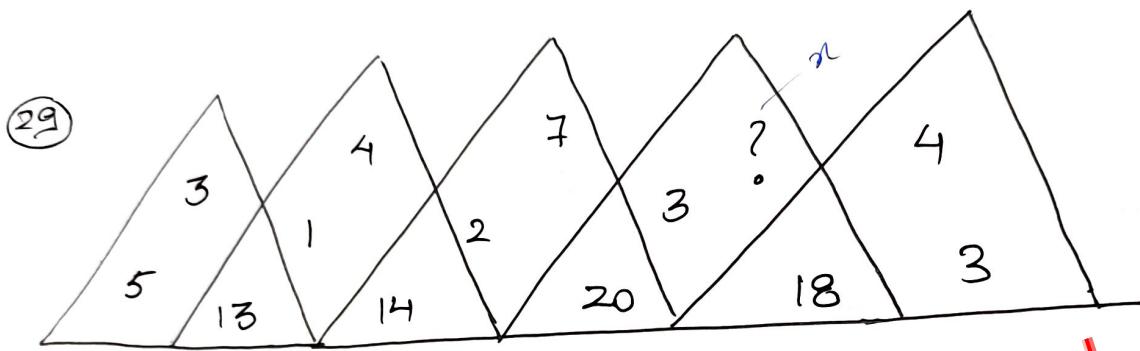
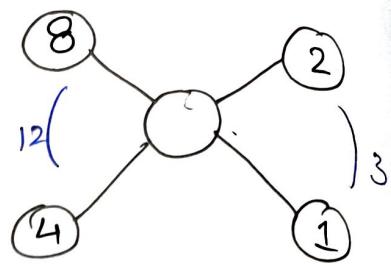
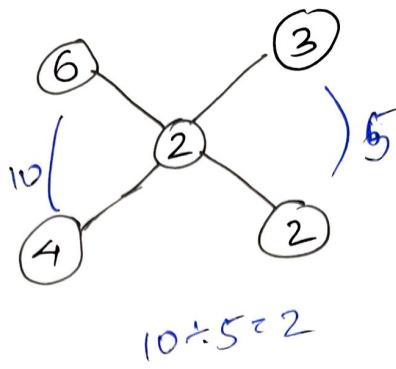
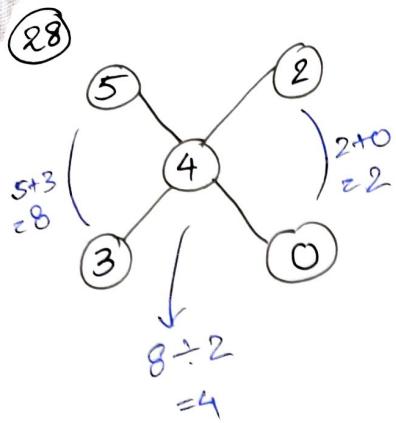
$$36 \div 3 = 10$$

$$\div 3 = 8$$

24

$$8 \times 2 = 16$$

$$6 \div 3 = 2$$



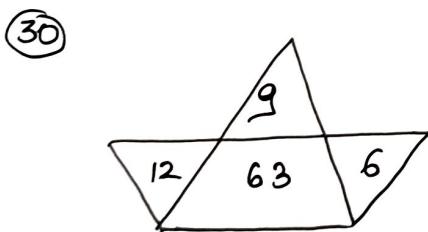
$$5+3+1+4=13$$

$$1+4+2+7=14$$

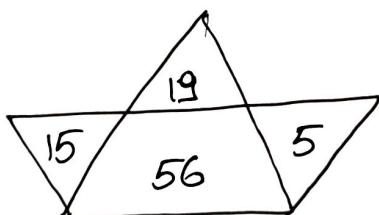
$$4+3+3+n=18$$

$$x=8$$
 ans

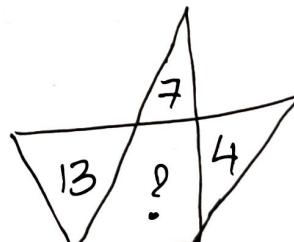
$$x=8$$



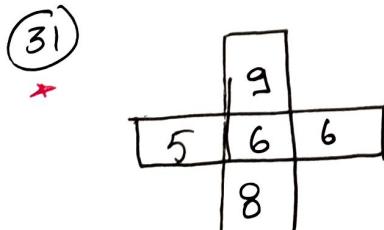
$$12 \times 6 - 9 = 63$$



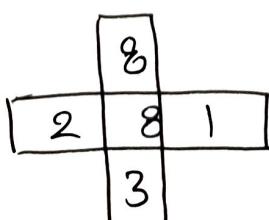
$$15 \times 5 - 19 = 56$$



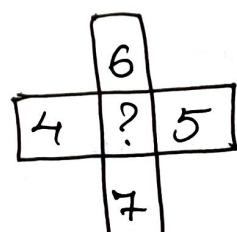
$$13 \times 4 - 7 = 52 - 7 = 45$$
 ans



$$(9+8) - (5+6) = 17 - 11 = 6$$

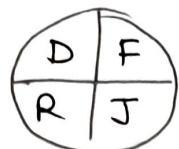
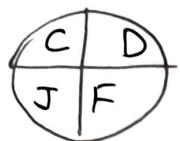


$$11 - 3 = 8$$



$$13 - 9 = 4$$
 ans

(32)



$$C = 3 \quad \text{Q}$$

$$3 \times 2 - 2 = 4 \\ = D$$

$$4 \times 2 - 2 = 6 \\ = F$$

$$6 \times 2 - 2 = 10 \\ = J$$

$$D = 4 \quad \text{Q}$$

$$4 \times 2 - 2 = 6 \\ = F$$

$$6 \times 2 - 2 = 10 \\ = J$$

$$10 \times 2 - 2 = 18 \\ = R$$

$$E = 5 \quad \text{Q}$$

$$N = 14$$

$$14 \times 2 - 2$$

$$= 26 \\ = Z \\ \text{dns}$$

(34)

4	5	7	3
8	3	3	9
7	6	9	5
6	9	8	?

19  
↓  
23  
↓+4  
27  
↓  
31

$$6 + 9 + 8 + x = 31$$

$$x = 31 - 23 = 8 \\ \text{ans}$$

(33)



Soln: By position Nos of alphabets

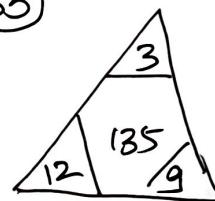
$$1 = \boxed{5 \ 12 \ 17}$$

$$11 = \boxed{8 \ 1 \ 9}$$

$$111 = \boxed{4 \ 15 \ 19}$$

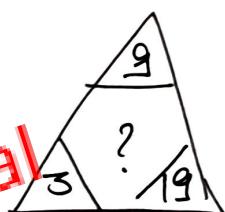
$$1111 = \boxed{19 \ 6} \\ = 19 + 6 \\ = 25 \\ = \underline{\text{Y dns}}$$

(35)



$$(3+12) \times 9 = 135 \\ (4+7) \times 15 = 165$$

$$\therefore 165$$



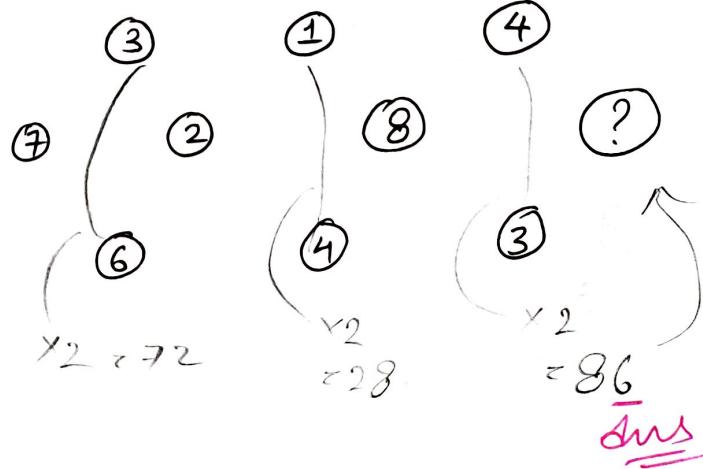
$$(3+9) \times 19 \\ = 228 \text{ dns}$$

(36) \*

$$369, \ 121, 518, 212, 427, 303, \dots$$

Actually table of 3  
 $\begin{array}{cccc} & 1 & 3 \\ 3 & 36 \end{array}$

(37)



(38)

$$926 : 24$$

$$799 : 72$$

$$956 : ?$$

$$(9 \times 2) + 6 = 24$$

$$(7 \times 9) + 9 = 72$$

$$(9 \times 5) + 6 = 51 \text{ ans}$$

		4	6		
3	2	8	4	2	?
9	3	7	4	3	
7			5		
5					

 $5 = \text{ans}$ 

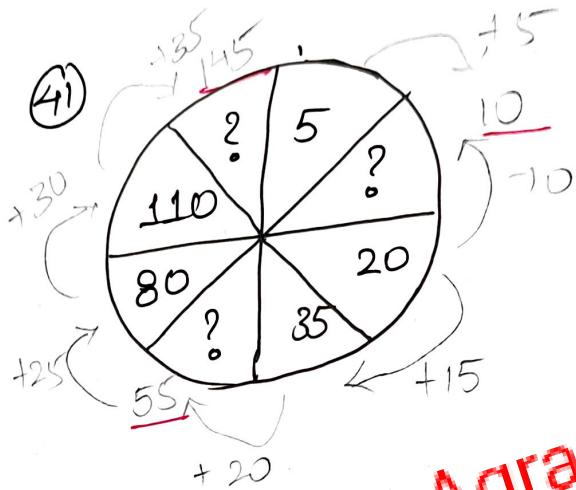
(39)

$$53 (3) 59$$

$$92 (4) 98$$

$$34 (2) 38$$

$$71 (?) 79$$



$$\textcircled{1} \quad 53 \rightarrow 5 (3 \times 3) 59$$

$$92(4) \rightarrow 9 (2 \times 4) 98$$

$$? (?) \rightarrow 79$$

$$(9) \text{ ans}$$

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5	3
8	12
7	5

20      20

4	5
14	6
2	9

20      20

7	8
?	13
6	9

 $30 - 13 = 17$ 

ans

$$\textcircled{2} \quad 53 (3) 59$$

$$5 \times 3$$

$$= 15$$

$$5 \times 9$$

$$= 45$$

$$\frac{45}{15} = 3$$

$$\begin{array}{l} 92 (4) 98 \\ 9 \times 2 \\ = 18 \\ 9 \times 8 \\ = 72 \end{array}$$

$$\frac{72}{18} = 4$$

$$\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array} \quad \begin{array}{r} 8 \\ < \\ 5 \end{array}$$

$$\begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array} \quad \begin{array}{r} 14 \\ < \\ 9 \end{array}$$

$$\begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array} \quad \begin{array}{r} 17 \\ > \\ 9 \end{array}$$

(43)

	7	
9	2	8

$$9 \times 8 = 72$$

written vertically

	2	
7	8	4

$$7 \times 4 = 28$$

	5	
6	?	9

$$9 \times 6 = 54$$

4 away

(44)

3	8	4	9	6	3
6	4	8	?	6	3
1	9	?	2	3	6
4	6	?	?	4	8
8	3	9	4	8	6
3	8	4	9	3	3

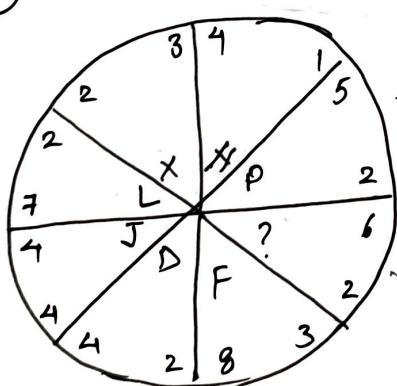
9	6	6	9	8	3
6	1	9	2	3	3
?	?	?	4	8	6
?	?	4	3	9	8
9	4	4	9	6	6

3 3  
6 8

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Page 12 ✓

(45)



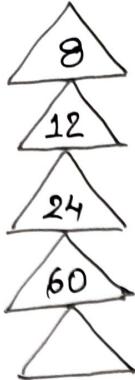
$5 \times 2 = 10$  = opp block has 10<sup>th</sup> letter J

$7 \times 2 = 14$  = N

A	B	C	D	E	F	G	H	I
K	L	M	N	O	P	Q	R	S
U	V	W	X	Y	Z			

~~24~~

46



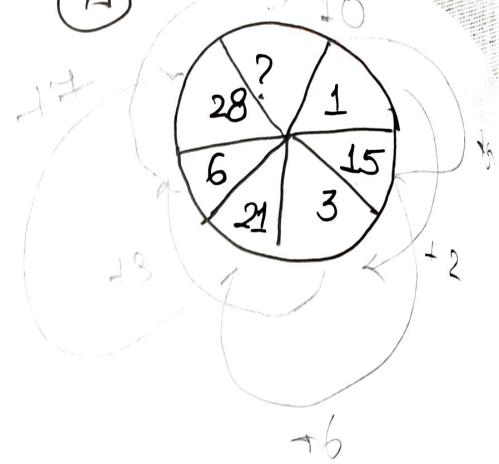
$$8 - 4 = 4 \quad 4 \times 3 = 12$$

$$12 - 4 = 8 \quad 8 \times 3 = 24$$

$$24 - 4 = 20 \quad 20 \times 3 = 60$$

$$60 - 4 = 56 \quad 56 \times 3 = 168$$

ans



47

W	B	4
C	U	9

$$\begin{aligned} 23 + 2 \\ + 3 + 21 \\ = 49 \end{aligned}$$

sum of  
position of  
alphabets

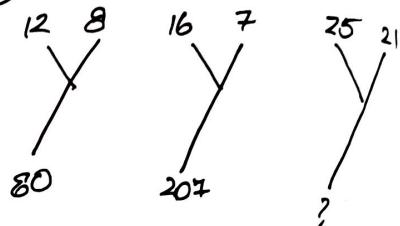
N	L	5
S	F	1

Z	Q	7
T	I	?

$$\begin{aligned} Z + Q + T + ? \\ - 6 + 17 + 20 \\ + 9 \\ = 72 \text{ ans} \end{aligned}$$

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50



$$\begin{aligned} 12^2 - 8^2 &= 16^2 - 7^2 \\ 144 - 64 &= 25^2 - 21^2 \\ 80 &= 625 - 441 \\ &= 184 \end{aligned}$$

51

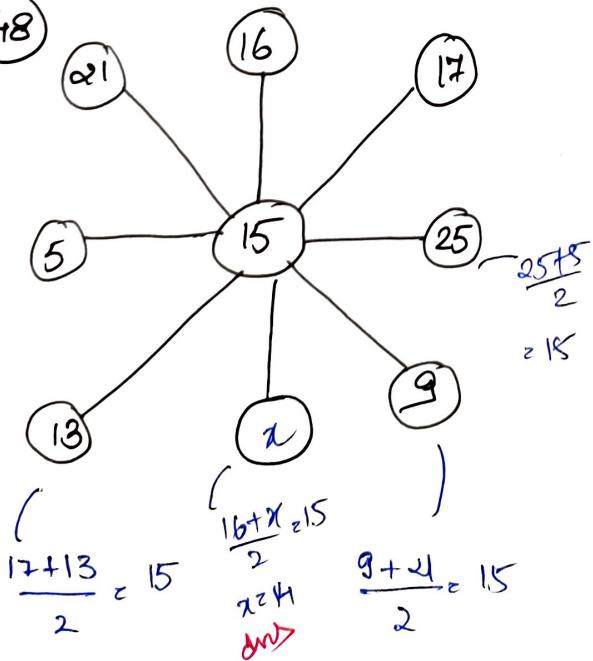
9			
3	4		
1	5	16	
?	14	7	23

↓      ↓      ↓      ↓

$13 + x = 23$      $23$      $16 + 7 = 23$      $23$

$x = 10$  ans

48



$$\frac{17 + 13}{2} = 15$$

$$\frac{16 + x}{2} = 15$$

$$\frac{9 + 21}{2} = 15$$

52

21		
19	24	
27	17	
15	30	
33	13	

$$36 = \text{ans}$$

my logic

43

44

45

46

47

53

2	7	17
3	11	19
5	13	

$$\begin{array}{cccc} 2 & 3 & 5 & 7 \\ 13 & 17 & 19 & 23 \end{array}$$

★ Prime nos

54

6	7	6
7	2	9
7	?	4

$$6+6 = (26)^2$$

$$7+9 = (27)^2$$

$$7+4 = (28)^2$$

55

32	16
48	24
58	72

58 not divisible by 8

Ans 58, 86

28	35
63	77
49	86

86 not divisible by 7

Ans 58, 86

57

8C	6B	7A
72A	?	56B
9C	5A	8B

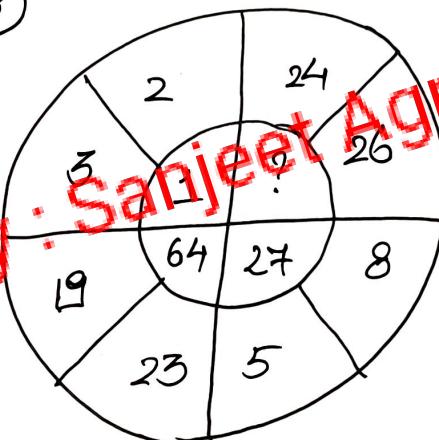
Each column  $\rightarrow 8 \times 9 = 72$ 

$$7 \times 8 = 56$$

$$\therefore 6 \times 5 = 30$$

Each row has A, B, C in 2<sup>nd</sup> row  
 C is missing  
 $\therefore 30C = \text{ans}$

58



$$3-2 = (1)^3 = 1$$

$$6-19 = 4 \quad (4)^3 = 64$$

$$8-5 = 3 \quad (3)^3 = 27$$

$$\therefore (28-26) = 2 \quad (2)^3 = 8 \quad \text{ans}$$

56

5		
32	44	17
6		

6x5 = 30 + 2 = 32

7x5 = 35 + 2 = 37

7x6 = 42 + 2 = 44

59

28	20	?
84	35	12
45	?	9

$$28 \div 7 = 4$$

$$84 \div 12 = 7$$

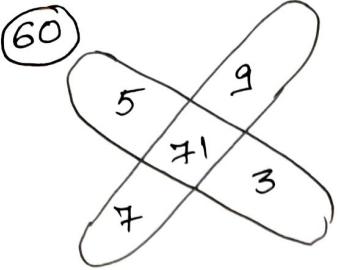
$$45 \div 9 = 5$$

$$4 \times 5 = 20$$

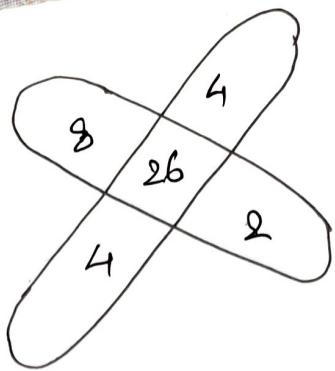
$$7 \times 5 = 35$$

$$5 \times 5 = 25$$

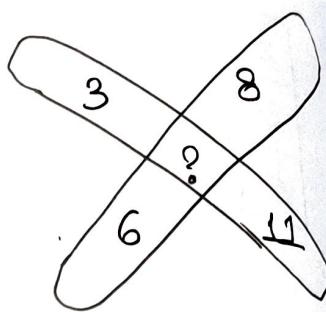
ans



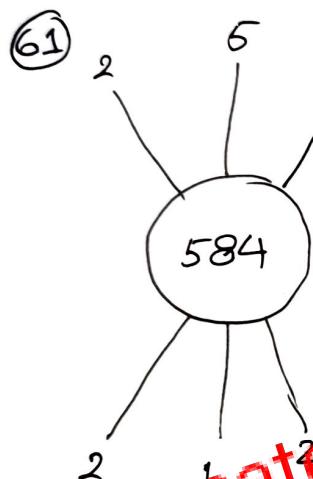
$$5 \times (7 \times 9) + (5+3) \\ = 63 + 8 \\ = 71$$



$$(4 \times 4) + (8+2) \\ 16 + 10 \\ = 26$$



$$(8 \times 6) + (3+11) \\ 48 + 14 \\ \text{Ans}$$



$$2 \times 4 = 8 \quad (\text{middle})$$

$$1 \times 5 = 5 \quad (\text{First})$$

$$2 \times 2 = 4 \quad (\text{Last})$$



$$3 \times 3 = 9$$

$$3 \times 2 = 6$$

$$2 \times 2 = 4$$



$$1 \times 7 = 7 \quad \text{middle}$$

$$1 \times 6 = 6 \quad \text{First}$$

$$2 \times 4 = 8 \quad \text{Last}$$

$\Rightarrow 678 \text{ Ans}$

(64)

31	32	36	45
----	----	----	----

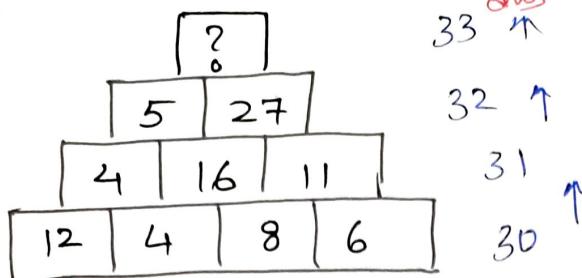
$$31 + (1)^2 = 32$$

$$32 + (2)^2 = 36$$

$$(36) + 3^2 = 45$$

$$45 + (4)^2 = 61 \text{ Ans}$$

(63)



33 ↑

32 ↑

31 ↑

30 ↑

(65)

83
11
2
?

79
16
7
5

68
?
5
4

$$8+3=11$$

$$7+9=16$$

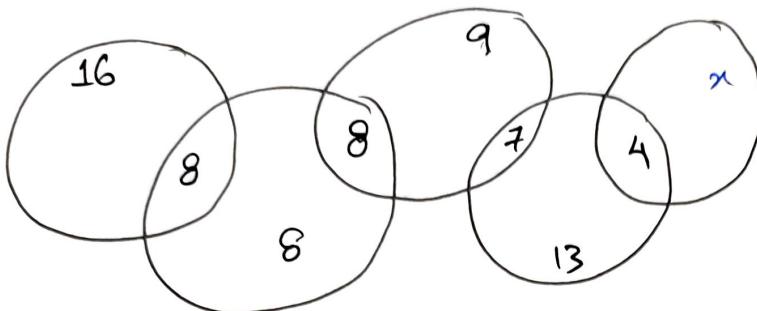
$$6+8=14$$

$$8+1=9$$

$$1+6=7$$

$$4+1=5$$

(64)



$$16+8=24$$

$$8+8+8=24$$

$$8+7+9=24$$

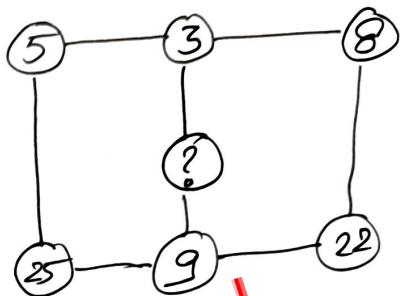
$$4+7+13=24$$

$$\left. \begin{array}{l} \text{Sum of nos.} \\ \text{in } \& \text{ circles} \\ = 24 \end{array} \right\}$$

$\therefore 4+x=24$

$$x=20$$

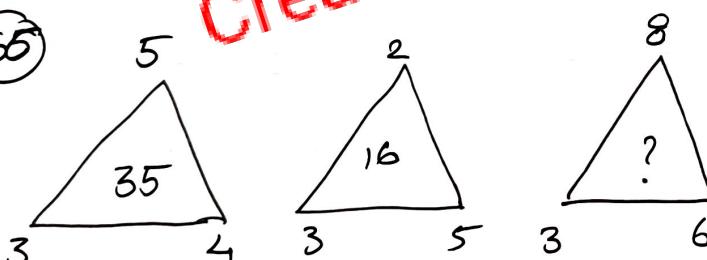
(67)



$$22+8=30$$

$$x=18 \quad \text{ans}$$

(65)



$$(3+4) \times 5$$

$$7 \times 5$$

$$= 35$$

$$(3+5) \times 2$$

$$8 \times 2$$

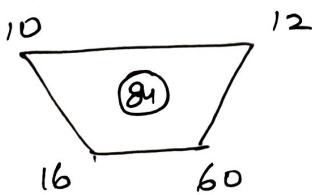
$$= 16$$

$$(3+6) \times 8$$

$$9 \times 8$$

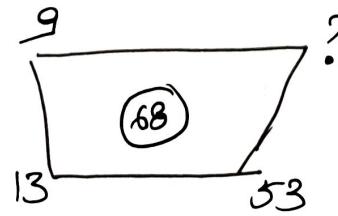
$$= 72 \quad \text{Ans}$$

(68)



$$100 - 16 = 84$$

$$144 - 60 = 84$$



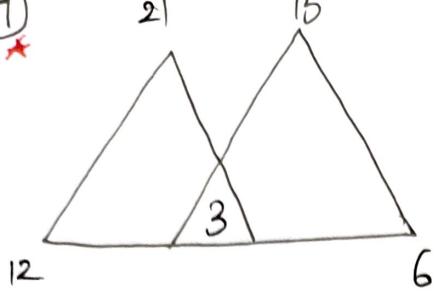
$$81 - 13 = 68$$

$$x^2 - 53 = 68$$

$$x^2 = 121$$

$$x = 11 \quad \text{Ans}$$

(67)



$$6 + (3)^2 = 6 + 9 = 15$$

$$12 + (3)^2 = 12 + 9 = 21$$

$$4 + (5)^2 = 29$$

$$x + (5)^2 = 36$$

$$x = 11 \quad \underline{\text{ans}}$$

(70)

5	2	3	?
6	3	3	9
4	1	3	5
8	1	7	?

$$5 - 2 = 3 \quad 5 + 2 = 7$$

$$6 + 3 = 9 \quad 6 - 3 = 3$$

$$4 + 1 = 5 \quad 4 - 1 = 3$$

$$8 + 1 = 9 \quad 8 - 1 = 7$$

(71)

7	4	5
8	7	6
3	3	?
29	19	31

$$7 \times 3 = 21$$

$$21 + 8 = 29$$

$$4 \times 3 = 12$$

$$12 + 7 = 19$$

$$5 \times ? = ?$$

$$? + 6 = 31$$

$$\cancel{?} = 5 \quad \underline{\text{ans}}$$

$$? = 25$$

(72)

4	1
3	

10	4
8	

22	10
18	

46	22
?	

$$(2 \times 4) + 2 = 10$$

$$(1 \times 2) + 2 = 4$$

$$\text{Ans} \quad (3 \times 2) + 2 = 8$$

$$(10 \times 2) + 2 = 22$$

$$(4 \times 2) + 2 = 10$$

$$(8 \times 2) + 2 = 18$$

$$(22 \times 2) + 2 = 46$$

$$(10 \times 2) + 2 = 22$$

$$(18 \times 2) + 2 = 38 \quad \text{Ans}$$

(73)

	2	
5	15	7
5	①	

	6	
4	19	11
2	②	

	1	
8	21	2
4	③	

	3	
8	23	6
3	?	x

$$5+5+7+2 = 19$$

$$4+11+2+6 = 23$$

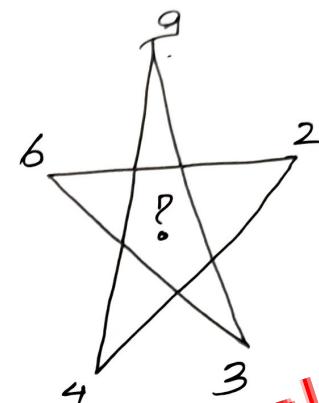
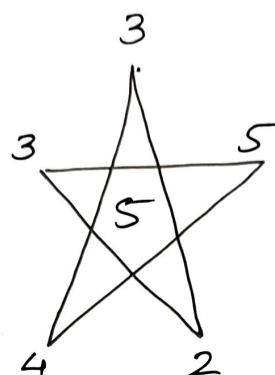
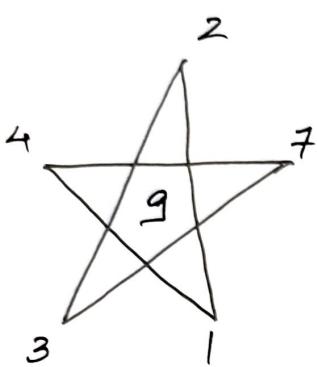
$$8+4+2+1 = 15$$

111 <sup>Ans</sup>

$$8+3+6+x = 21$$

$$x = 4 \quad \underline{\text{Ans}}$$

(74)



$$(4+7+2) - (3+1) = 13 - 4 = 9$$

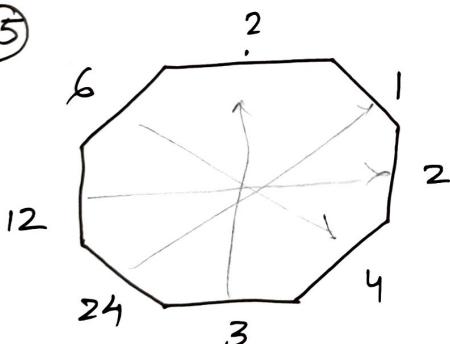
$$(3+5+1) - (4+2) = 9 - 6 = 3$$

$$17 - 7 = 10$$

Ans

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(75)



$$24 \times 1 = 24$$

$$6 \times 4 = 24$$

$$12 \times 2 = 24$$

$$3 \times 8 = 24$$

Ans

Product  
with  
opp. side

(76)

12

9

3

10

78

$$\frac{78}{6} = 13$$

$$\frac{60}{6} = 10$$

$$\frac{24}{6} = 4$$

$$13 - 1 = 12$$

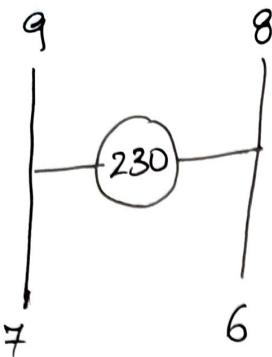
$$10 - 1 = 9$$

$$4 - 1 = 3$$

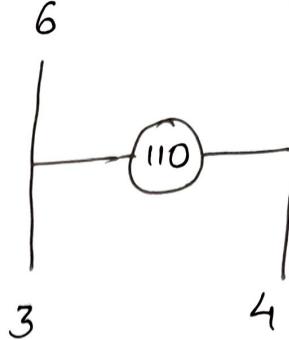
$$\frac{66}{6} = 11 \quad 11 - 1 = 10$$

Ans

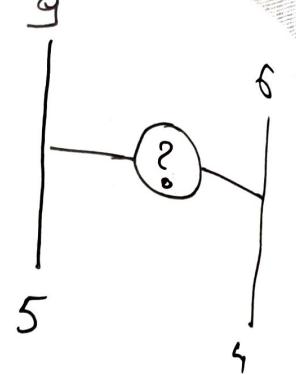
(77)



$$49 + 36 + 64 + 81 = 230$$



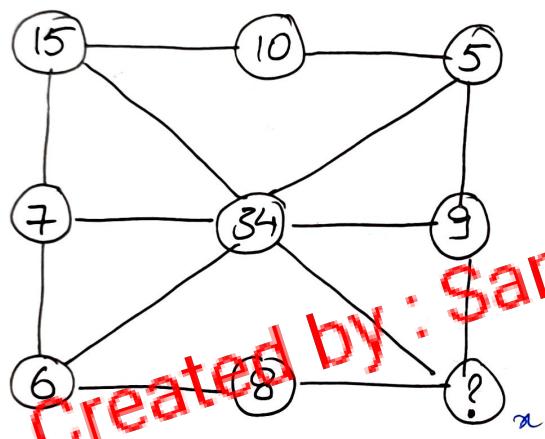
$$3^2 + 4^2 + 6^2 + 7^2 = 110$$



$$\begin{aligned} 9^2 + 6^2 + 5^2 + 4^2 &= 81 + 36 + 25 \\ &= 158 \end{aligned}$$

Ans.

(78)



$$10 + 7 + 9 + 8 = 34$$

$$15 + 5 + 6 + x = 34$$

$$x = 34 - 26$$

$$x = 8 \quad \underline{\text{Ans}}$$

(79)



$$134 \Rightarrow 84$$

$$134 - 84 = 50$$

$$178 \Rightarrow 78$$

$$178 - 78 = 100$$

$$190 \Rightarrow 40$$

$$190 - 40 = 150$$

$$290 \Rightarrow ?$$

$$290 - x = 200$$

$$x \approx 90$$

ans

~~WRONG NUMBER SERIES~~

Q1. 8 12 24 64 180 630

Small  $\rightarrow$  start Large  $\rightarrow$  end  $\Rightarrow$  Multiplication

$$\begin{array}{ccccccc}
 8 & 12 & 24 & 64 & 180 & 630 \\
 \downarrow & & & & & & \\
 \times 3 & & \times 2 & \times 2.5 & 60 & & \\
 2 & & & & & \hookrightarrow \times 3 & \\
 1.5 & & & & & & \\
 \end{array}$$

$\therefore \underline{64}$  is wrong

Q2. 599 598 561 446 103

$$\begin{array}{ccccc}
 \downarrow & \downarrow & \downarrow & \downarrow & \\
 -1 & +37 & X & -343 & \\
 (-1)^3 & (-3)^3 & & (-7)^3 & \\
 \end{array}$$

$\therefore \underline{561}$  is wrong

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Q3. 9 7 15 44 175 874

$$15 \times 3 = 45 - 1 = 44$$

$$44 \times 4 = 176 - 1 = 175$$

$$175 \times 5 = 875 - 1 = 874$$

$$9 \times 1 = 9 - 1 = 8$$

$$8 \times 2 = 16 - 1 = 15$$

$\therefore \underline{7}$  is wrong

Q.4.

$$\begin{array}{ccccccc}
 & & -13 & & +11 & & \\
 103 & 97 & 116 & 84 & 130 & 69 & 145 \\
 & +13 & & +14 & & +15 &
 \end{array}$$

$\therefore 69$  is wrong  
To should come

Q5.

$$\begin{array}{cccccc}
 24 & 28 & 55 & 71 & 196 & 242 \\
 4 & 27 & 16 & 125 & & 36 \\
 2^2 & 3^3 & 4^2 & 5^3 & & 6^2
 \end{array}$$

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$\therefore 242$  is wrong

Q6.

$$504$$

$$252$$

$$86$$

$$21$$

$$402$$

$$0.7$$

$$\frac{504}{2} = 252$$

$$\frac{21}{5} = 4.2$$

$$\frac{252}{3} = 84$$

$$\frac{4.2}{6} = 0.7$$

$$\frac{84}{4} = 21$$

$\therefore 86$  is wrong

$$\begin{array}{ccccccc}
 07. & 74 & 78 & 94 & 132 & 194 & 294 \\
 & +4 & +16 & +38 & +62 & +100 & \\
 & 2^2 & 4^2 & & & & \\
 & & & +36 & +8^2 & & \\
 & & & (6)^2 & 64 & & \\
 \end{array}$$

Squares of  
even nos.  
are being add.

$\therefore 132$  is wrong

$$08. \quad 1440 \quad 248 \quad 48 \quad 12 \quad 4 \quad 2$$

$$2 \times 2 = 4$$

$$4 \times 3 = 12$$

$$12 \times 4 = 48$$

$$48 \times 5 = 240$$

$$240 \times 6 = 1440$$

$\therefore 248$  is  
wrong

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$$09. \quad 142 \quad 70 \quad 35 \quad 16 \quad 7 \quad \cancel{25} \quad 25$$

$$\frac{142}{2} = 71 - 1 = 70$$

$$\frac{70}{2} = 35 - 1 = 34 \quad \therefore 35 \text{ is wrong}$$

$$\frac{34}{2} = 17 - 1 = 16$$

$$10. \quad 89 \quad 86 \quad 78 \quad 63 \quad 39 \quad 5$$

$$\begin{array}{cccc}
 & -3 & -8 & -15 \\
 & -5 & -7 & -9 & -11
 \end{array}$$

$\therefore 5$  is wrong

$$11. \quad 259 \quad 257 \quad 253 \quad 245 \quad 230 \quad 197$$

$$\begin{array}{ccccc}
 & -2 & -4 & -8 & -15 \\
 & -16 & & & -32 \\
 & & & & -32
 \end{array}$$

$\therefore 230$  is wrong

$$12. \quad 10 \quad 22 \quad 46 \quad 96 \quad 109 \quad 382$$

$$10 \times 2 + 2 = 22$$

$$190 \times 2 + 2 = 382$$

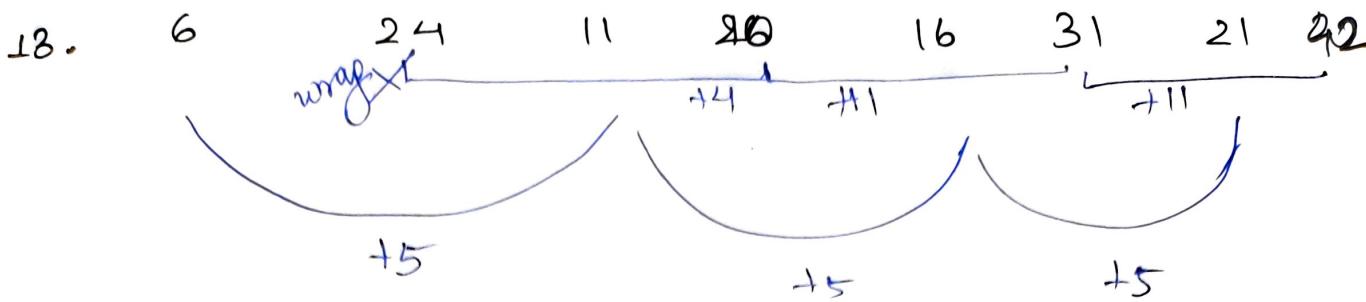
$$22 \times 2 + 2 = 46$$

$\therefore 96$  is wrong

$$46 \times 2 + 2 = 94$$

$$94 \times 2 + 2 = 190$$

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14.  $5760$  ?  $1440$   $160$   $10$   $0 \cdot 4$

$$0 \cdot 4 \times 25 = 10 \quad (5^2)$$

$$10 \times 16 = 160 \quad (4^2)$$

$$160 \times 9 = 1440 \quad (3^2)$$

$$1440 \times 4 = 5760 \quad (2^2)$$

$$5760 \times 1 = 5760$$

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15.  $4$   $3$   $2$   $4$   $16$   $128$   $2048$

$$\frac{4 \times 1}{2} = \underbrace{2}_{\times 1} \underbrace{x 2}_{\times 2} \underbrace{\times 4}_{\times 4} \underbrace{\times 8}_{\times 8} \underbrace{\times 16}_{\times 16}$$

$\therefore 3$  is ~~wrong~~

16.  $16$   $13 \cdot 9$   $18 \cdot 1$   $11 \cdot 8$  ?

$$\begin{array}{r} \underbrace{-2 \cdot 1}_{+2 \cdot 1} \\ \hline \end{array} \quad \begin{array}{r} \underbrace{+4 \cdot 2}_{+4 \cdot 2} \\ \hline \end{array} \quad \begin{array}{r} \underbrace{-6 \cdot 3}_{+8 \cdot 4} \\ \hline \end{array} \quad \begin{array}{r} \hline \\ \hline \end{array} \quad \approx 20 \cdot 2$$

Q1. In a certain language, if SUNSHINE is coded as TVOTIJOF then how will be MOON coded?

Sol:

S U N S H I N E  
—  
+1

T V O T I J O F

∴ MOON = N P P O

★

Q2. In a certain code language if WRONG is coded as GNORW then RIGHT is?

Sol: Reverse  $\rightarrow$  THGIR

- (a) HIGRT
- (b) SJHIU
- (c) GHIRT
- (d) THIGR

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If we apply logic of reverse

RIGHT  $\rightarrow$  THGIR  $\rightarrow$  doesn't  
match  
any option

∴ apply diff. logic

WRONG - GNORW  
 $\rightarrow$  arranged in  
alpha order

∴ RIGHT = GHIRT ⓒ

Q3. SNOW = 3100

WALL = ?

S	N	O	W
19	14	15	23 = 71

(a) 5000

(b) 4200

(c) 4800

(d) 4000

W A L L

23 1 12 12 = 48

(c)

Q4. CAP = 61

FEN = ??

(a) 40

(b) 66

(c) 85

(d) 46

C A P

3 1 16

$\underbrace{17}_2 \times \frac{3}{2}$

= 51

Logic failed

P	E	N
16	5	14
$\underbrace{\quad\quad\quad}_{19}$		

∴ C A P  
3 1 16

: P E N  
16 5 14

27-3 27-1 27-16  
24 26 11

11 22 13

= 46 (d)

24 + 26 + 11 = 61

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Q5. MOUSE = PNUFT

CLOCK = ?

- (a) MDOLD
- (b) MDPLD
- (c) NDOLD
- (d) MDOLE

M	O	U	S	E
13	15	21	19	5
P	N	U	F	T
16	14	21	6	20
		+0		

Q6. KEYS = MDAR

LOCK = ??

- (a) NEJJ
- (b) NNEJ
- (c) JENN
- (d) JENJ

K	E	Y	S
11	5	25	19
↓+2	↓+2	↓+2	↓+2
M	D	A	R
13	4	1	18

L	O	G
↓+2	↓-1	↓+2
N	P	J
		↓-1
		⑥

$$07. R A D A R = * ? * ? \#$$



$$DOOR = ? \% \#$$

DAM =? (Find out)

order is not imp

(a) ? # %

(b) \* # ?

(c) \* # /

(d) ?? #

$$\begin{matrix} R & A & D & A & R \\ * & ? & * & ? & \# \end{matrix}$$

$$R/A = */? \quad (2 \text{ times})$$

~~(\*)~~ ~~(#)~~

$$\begin{matrix} D & O & O & R \\ ? & \% & \% & \# \end{matrix}$$

$$\begin{matrix} O = \% \\ (2 \text{ times}) \end{matrix}$$

~~(\*)~~ ~~(#)~~  
Re?

$$\begin{matrix} R = * | ? \\ D = * | ? \end{matrix}$$

$$A, R = *, ?$$

$$O = \%$$

$$D, R \rightarrow ?, \#$$

$$R = ?$$

$$D = \#$$

$$A = *$$

$$\therefore DAM = \# * / ^ m$$

08. sn

(A) 'n

(B) '

(C)

which

me

wa

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- Q8. In a certain language  
(A) 'mu ma sam' means 'water is life'  
(B) 'sam na zo' means 'Glass of water'  
(C) 'chi zo ma' means 'life of Pi'  
which represents 'Pi'?

mu      ma      sam

"            na            zo

"

"      chi

water      is      life

Glass      of

"

"      pi

∴      pi = chi

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Q10.

TEARS = 18

WATER = ??

Soln:

T	E	A	R	S
20	5	1	18	19
2+0	5	1	$1+8$ $= 9$	$1+9 = 16$
$\approx 2$				$1+0 = 1$

making single digit

$$\text{sum} = 2+5+1+9+1 \\ = 18$$

W	A	T	E	R
23	1	20	5	18
2	2	5	9	

$\approx 22$

Q11. If FIRE is coded as # \* ? % , then  
FREEZE will be coded as ?

- (a) # & % ? \*
- (b) ?? % . ? # \*
- (c) % . ? . ? ^ ^
- (d) ??? . # @

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Sol<sup>n</sup>: (a), (b) excluded :: we have 3 Es  
in FREEZE

(c) excluded ::  $\gamma = 3$   
 $\gamma = 2$

$\therefore (d) = \underline{\text{ans}}$

12. THUMB = ~~B~~ BM AHT

CRUMB = ??

C R U M B  
↓ -20 ↓ -20 ↓ -20  
B M A H T  
2 13 1 8 20

(b)

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13. SLOW MOVE, GET BACKWARDS, FIRE AWAY

is written as:

V FMD ZMW E, BEN PCT LD COXY, QHDF CDC

BRICKS = ??

on observing

B R I C K S  
↑ ↓ ↓ ↓ ↓ ↓  
P O H T L V

(c)

- (a) POH TVL
- (b) POH LLV
- (c) POH TLV
- (d) POH VLT

14. BATMAN = 123416      (a) 32987  
 PERMAN = 987416      (b) 32897  
 (c) 38987  
 TAPER = ??      (d) 21987

B	A	T	M	A	N
12	81	20	13	1	14

X  
useless

$$MAN = 416$$

$$BAT = 123$$

$$PER = 987$$

P	E	R	M	A	N
16	5	18	13	1	14

T	A	P	E
32		987	

*Created by: Sanjeet Agrawal*

$B = 1$        $A = 2$        $\therefore \text{Ans} = \text{a}$

15.  $R = 19$        $R = 18$        $18 + 1(R) = 19$

$$RON = 50$$

$$\text{FONTS} = ?$$

$$RON$$

$$18 + 15 + 14 = 47 + 3(\text{3 alpha})$$

(a) 75

(b) 76

(c) 77

(d) 78

(e) 79

$$\therefore \text{FONTS}$$

$$= 6 + 15 + 14 + 20 + 19$$

$$+ 5 (\text{5 alpha})$$

$$= 49$$

(e)

16. ACID = C I C D

PAMPER = P I M P 2 R

BOMBAY = ?

(a) B 4 M B 1 Y

(b) B 3 M B 1 Y

(c) B 5 M B 2 Y

(d) B 4 M B 2 Y

Sol<sup>n</sup>:

$$A = 1$$

$$\begin{array}{lll} A = 1 & E = 2 & I = 3 \\ O = 4 & U = 5 \end{array}$$

I = 3      E = 2       $\Rightarrow$  only vowels are converted to nos.

B O M B A Y = B (O) M B (A) Y

= B 4 M B 1 Y

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Q17. 'blue' means 'green', 'green' means 'yellow', 'yellow' means 'orange', 'orange' means 'black', 'black' means 'white', 'white' means 'red', 'red' means 'pink', 'pink' means 'brown', 'brown' means 'grey', then what is the color of human blood?

(a) Grey

(b) Red

(c) white

(d) orange

(e) Pink

Blood  $\approx$  red = pink (X)  
pink  $\approx$  brown  $\approx$  grey (X)

white means red

$\Rightarrow$  So Bhi red  $\frac{1}{2}$  of White (C)

Q18. If 'dog' is called 'cow', 'cow' is called 'bison', 'bison' is called 'snake', 'snake' is called 'mongoose', 'mongoose' is called 'crocodile', then which one is reared as pet?

- (a) Lion
- (d) Crocodile
- (b) Bison
- (e) None
- (c) Snake

Ans. (a)

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# SYLLOGISM

Syllogism →

- Normal → Income - expense Venn diag (easier method)
- Possibility → only by venn if words like 'can be', 'being possibility', 'being chance'

If at least one venn diag correct → conclusion in the conclusion part of question possible

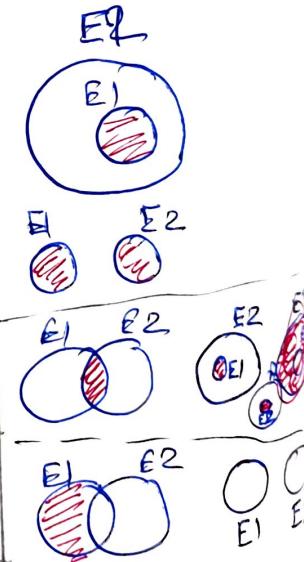
⇒ possibility sum.

If possible in all → false  
→ we need one true & one false.

## # Income - Expense Method

①  
↓  
Alphabetical order

	$E_1$	$E_2$
All	100	50
No / None	100	100
Some	50	50
Some ... Not	50	100



$$4 \rightarrow 100 \quad 4 \rightarrow 50$$

② Income  $\geq$  Expense

③ common must have 100 value.

Statements :

(I) Some Bottles are Glass.

(II) All the Glasses are Cables.

Conclusions :

(I) No Glasses are Cables.

(II) Some cable are Bottles.

Sol<sup>n</sup>:

Statements — Income

(I) Bottles      <sup>50</sup>  
                    Glass      <sup>50</sup>

(II) Glass      Cables  
                    <sup>100</sup>      <sup>50</sup>

Conclusion — Expenditure

(I) Glass      Cables      <sup>100</sup>  
                    <sup>100</sup>

(II) Cables      Bottles  
                    <sup>50</sup>      <sup>50</sup>

C(I) → ~~50~~ ~~50~~ Income  $\geq$  Exp X  
⇒ False via start (2)

C(II) → 50 & (II)

Glass = 100 ✓ common

(In exp) Req.  $B_0 = 50$  ✓ True  
Cables = 50 ✓

- Q2. Stmt :  
 (I) No girl is boy. 100  
 (II) All boys are red. 50  
100

conclusions :

- (I) No girl is red. 100  
 (II) Some red are boys. 50  
50

Conclusion (I)

Req.  $\rightarrow$  girl  $\rightarrow$  100  
 red  $\rightarrow$  100

Stmt (I) & (II)  
 common  $\rightarrow$  boy = 100✓  
 but red = 50.

$\Rightarrow$  false

Conclusion (II)

Req.  $\rightarrow$  50  
50

We have 100 100 from S(II)

True

Q3. Statements :

- (I) Some cats are white. 50  
50

- (II) All white are dog. 50  
100

- (III) No dog is snow. 100  
100

Conclusion :

- (I) No cats are dogs. 100  
100

- (II) Some cats are dogs. 50  
50

- (III) No white is snow. 100  
100

**Created by : Sanjeet Agrawal**

conclusion (I) :-

stmts req  $\rightarrow$  1 & II common  
white = 100 ✓ ~~False~~

cats req = 100 ✗ False

con (II) :-

$\&$  (I) & (II) com ✓ True

con (III) :-

s(I) & (II) dog = 100 (common) ✓

	Red	We have	
white	100	100 ✓	True
Snow	100	100 ✓	

Q4. Statements : *Created by : Sanjeet Agrawal*

(I) All humans are instruments  $\frac{100}{50}$

conclusions :

(I) All flutes are instruments  $\frac{100}{50}$

(II) All Humans are flutes.  $\frac{100}{50}$

C(I)

F = 100 ✗ False

C(II)

S(I) & S(II)

instr = 100 ✓

human = 100 ✓ True

flutes ? 50 ✓

Q5. Statements :

- (I) Some laptops are keyboard. 50
- (II) All the cables are keyboard. 50

Conclusions :

- (I) Some keyboards are cable. 50

- (II) Some keyboards are laptops. 50

C(I) :-

from S(II)

$$\text{cables} \approx 50 \quad \checkmark$$

$$\text{keyba} \approx 50 \quad \checkmark \quad \text{True}$$

C(II) :-

from S(I) ~~2nd statement~~

$$\text{keyba} \approx 50 \quad \checkmark \quad \text{True}$$

$$\text{laptops} \approx 50$$

## # POSSIBILITY

find 1 ✓

1 ✗

# we need one 'correct' & one 'incorrect' situation

⇒

✓ 1 ✗ 2

✓/✗  
3

✓

✗ possible  
→ false

✓ 1 ✓ 2

✓  
3

✗

✗ not possible  
→ true

Q. statements :

1> All A are B.

2> All B are C.

conclusions :

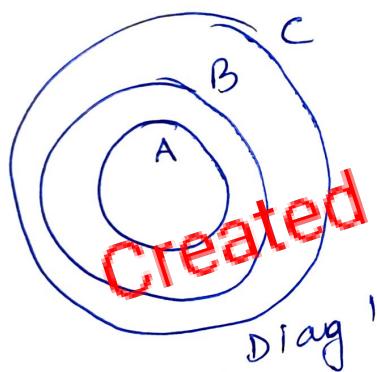
1> All B can be A.

2> Some C not being B is a possibility.

3> Some C can be B.

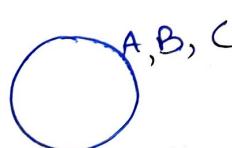
4> Some A can be C.

Sol<sup>n</sup>: from stmnt 1 & 2



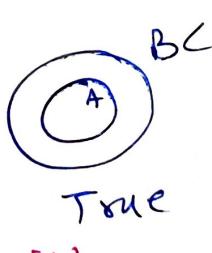
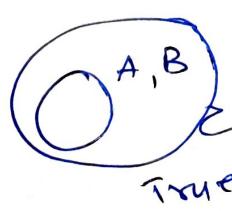
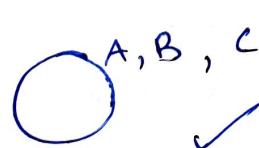
conclus<sup>n</sup> 1; ✓ ( 1 false 1 true ) ∵ possible

conclus<sup>n</sup> 2: Diag 1 ✓ true



Diag 2 ✗ false ∵ possible

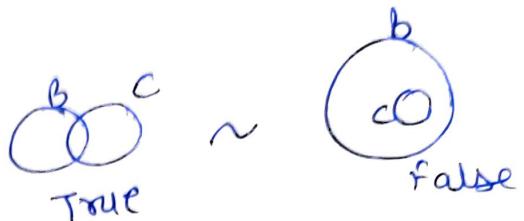
C(III); Diag 1 ✓ true



C (iv) :-      Diag 1 ✓  
 Diag 2 ✓  
 No other situat<sup>m</sup>       $\Rightarrow$  NOT possible

## Q2. Statements

1. Some A are B.
2. Some B are C.

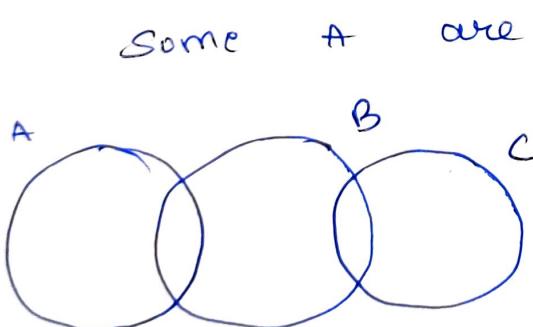


## conclusions

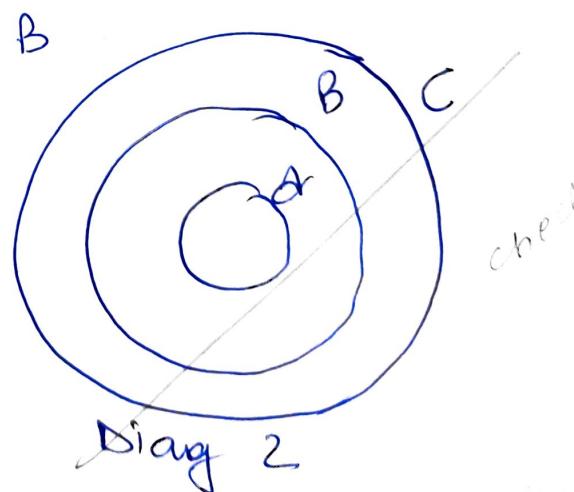
1. All A can be C.
2. Some C not being B is a possibility.
3. All B can be A.
4. No A can be B.
5. Some B can be A.

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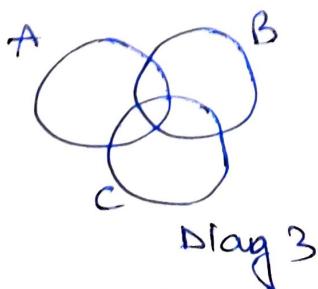
Sol:



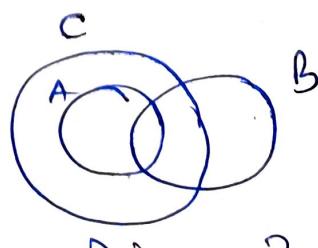
Diag 1



Diag 2



Diag 3



Diag 3

C(1)

X

Diag 2 ✓

Diag 3 X

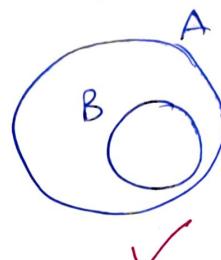
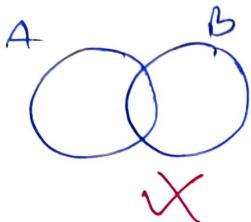
Final  
cover  
possible

C(1)

Possible

C(11)

→ from Stmt 1



some A are B

Possible

C(iv) → from Stmt 1

Not possible

Created by : Sanjeet Agrawal

C(V)



True



True

Not possible

Q3.

- Statements : (I) All A are B.  
(II) Some B are C.  
(III) Some C are D.  
(IV) All D are E.

Conclusions : (I) Some A can be B.

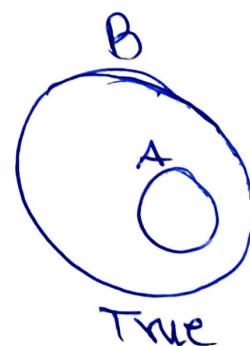
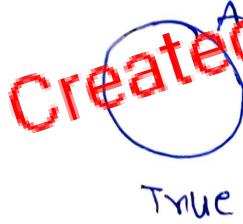
(II) Some D can be C.

\* (III) All B being ~~E~~ is a possibility.

Solution:

Conclusion (I)

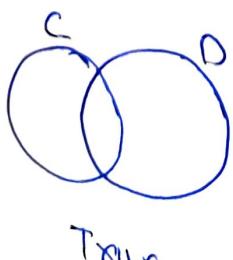
from stmt I



X

Conclusion (II)

from



stmt (III)

C

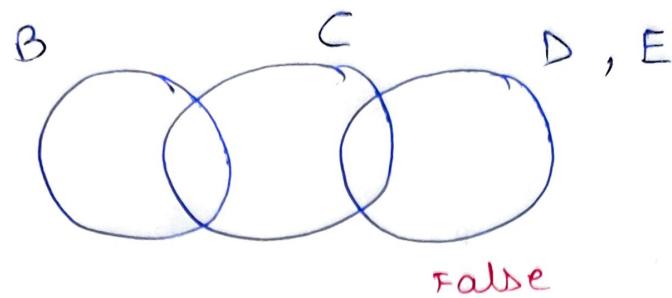


X

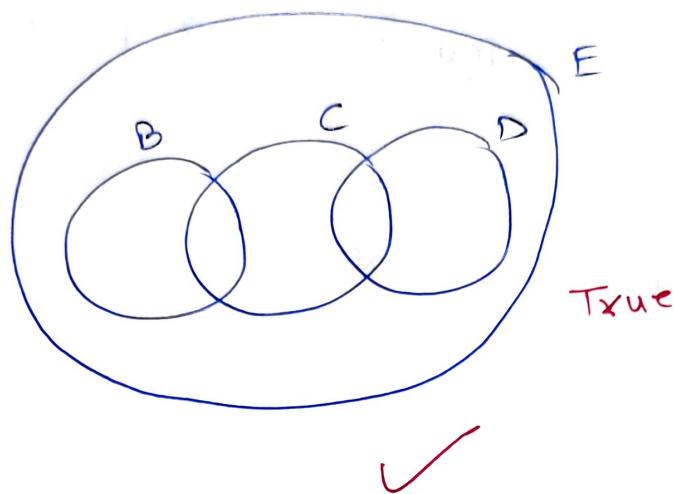
True

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conclusion (111)



False



True



C(111) → Possible.

Q4. ~~(1)~~ No A is B.

(II) No B is C.

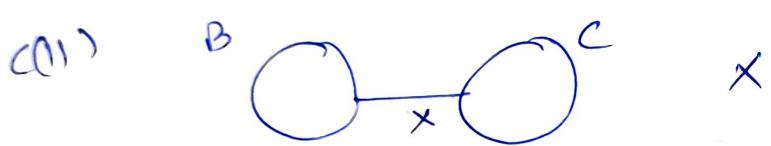
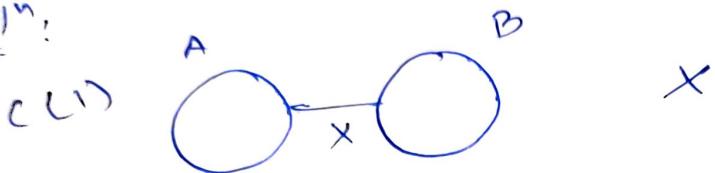
### Conclusions

(I) Some A can be B.

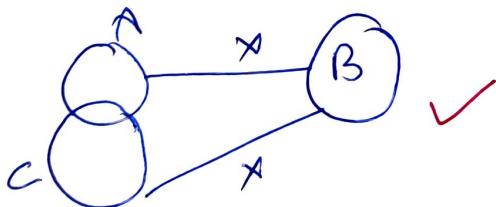
(II) All B can be C.

(III) Some C not being A is a possibility.

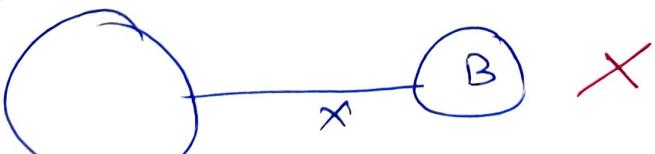
Sol:



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AC



all  
C is X

∴ C(II) possible

Q5.

## Statements

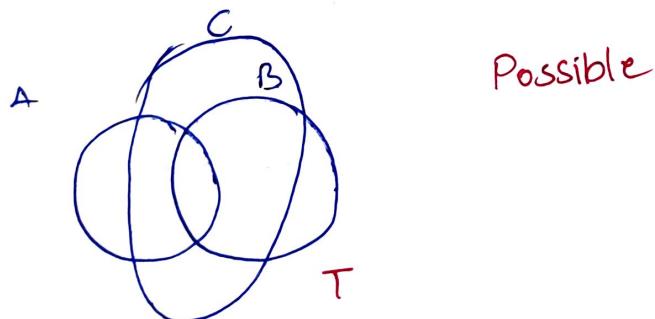
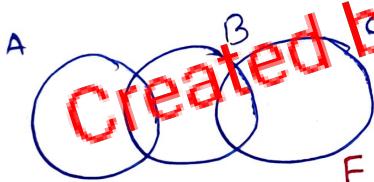
- (I) Some A are not B.  
(II) Some B are not C.

## Conclusions

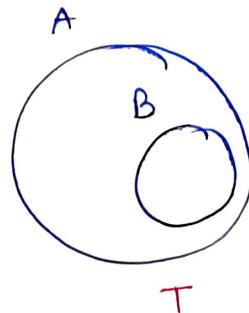
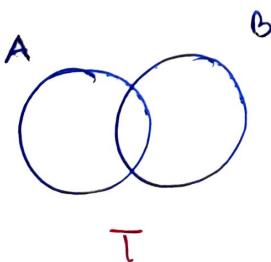
- (I) Some A can be C.  
(II) Some B can be A.  
(III) Some A not being B is a possibility.

Tip → If you are 100% sure of a thing from stmts & if it is asked as a possibility in conclusions mark it as False. (S(I) & C(III))

C(I)



C(III)



Not possible

### Q.6. Statements

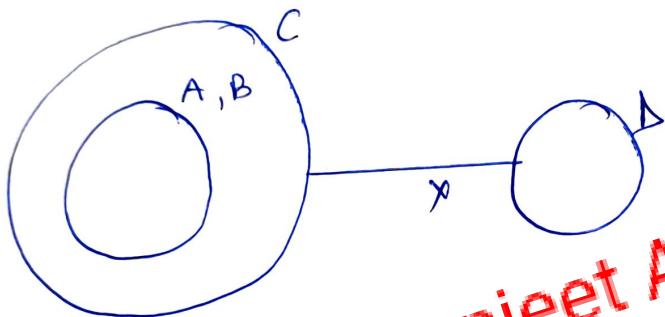
- Q  
S(1) All A are B.  
S(II) All B are C.  
S(III) No C is D.

Conclusions :

1> No B can be D

2> Some A being B D is a possibility

S Soln:



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∴ sure B & D not connected

∴ Not possible

∴ common sense  $\rightarrow$  not posse

( $\because A \not\Rightarrow ( \leftarrow \not\rightarrow )$ )

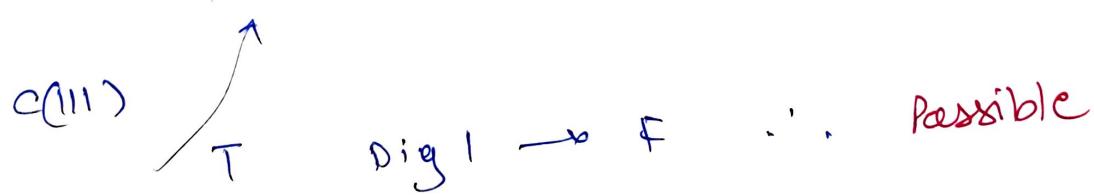
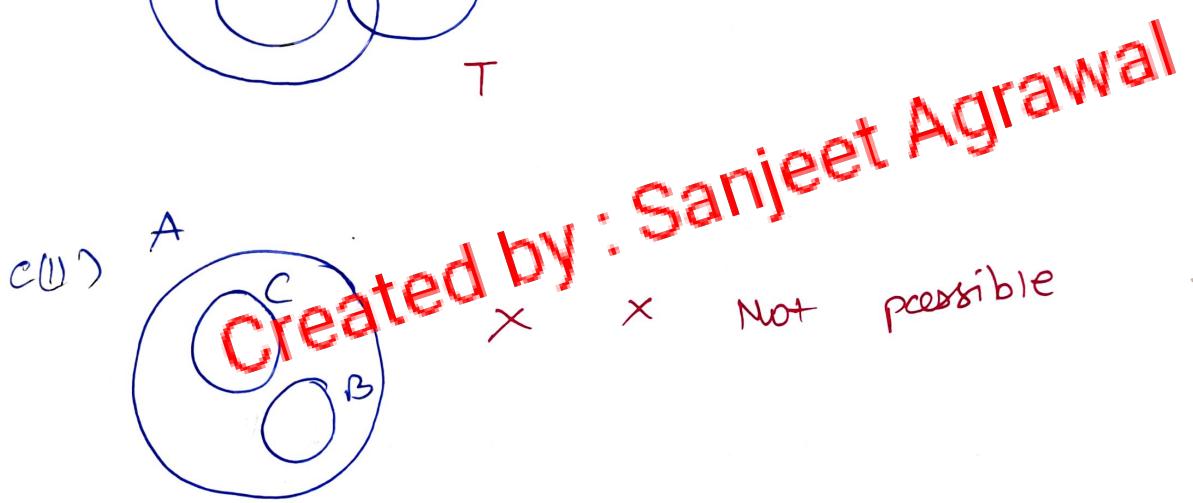
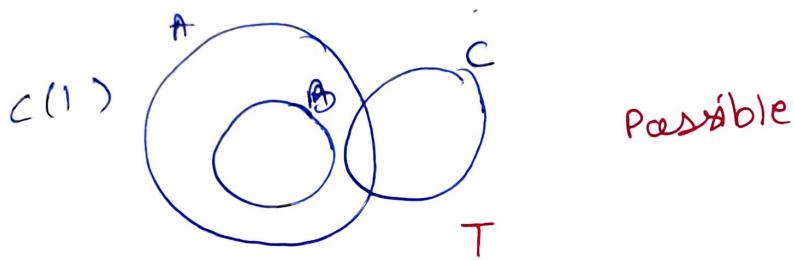
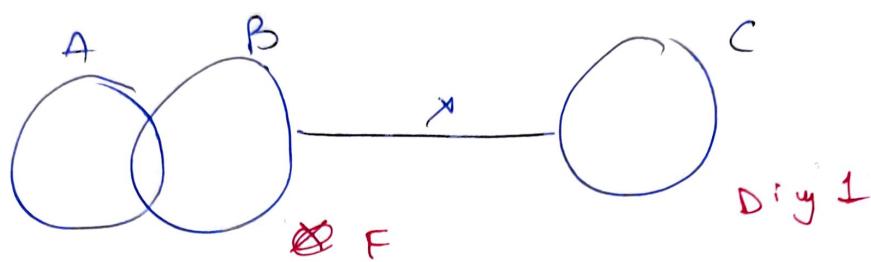
### Q7. Statements :

- Q7. 1. Some A are B.  
2. No B are C.

conclusions:

- 1> Some A being C is a possibility.
- 2> All A being C is a possibility.
- 3> No C being A is a possibility.

sol<sup>n</sup>:



Q. statements

- I. All fruits are lions.
- II. All lions are foxes.
- III. Some foxes are beggars.

Conclusion

- C. 1. All fruits are foxes.
2. Some fruits are beggars.

S<sub>r</sub> Sol<sup>n</sup>: C(1)

C(1) & S(1) ✓

income	Fruits 100	Lions 50
		foxes 50
	Lions 100	

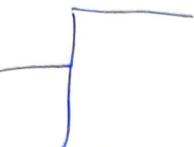
all fruits are foxes ✓

C(1) F ∵ foxes = 50 in S(III) T

~~10:15~~

10:15

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ones   
 With reference

\* odd days - Usually no. of days excluded from complete cycle of the week.

M	T	W	T	F	S	S
---	---	---	---	---	---	---

7 days = 1 cycle

8 days → 8<sup>th</sup> day = Monday

9 days → 8<sup>th</sup>, 9<sup>th</sup> day = Mon, Tue

excluded from  
the cycle

 13 days → 6 odd days

Q. Find odd days in 13 days.

Sol<sup>n</sup>  
=

$$7 ) 13( 1$$

$$\begin{array}{r} 7 \\ \hline 6 \end{array} \leftarrow \text{ODD days}$$

NOTE: Min no. of odd days = 0

Max no. of odd days = 6

Q.2 Find the no. of

Soln  
 $\overline{7} \overline{5} 100 \overline{2} 14$

$$\begin{array}{r} -7 \\ \hline 30 \\ -28 \\ \hline 2 \end{array}$$

# No of days

<del>Week</del> Month	28 / 29 / 30 / 31
<del>Week</del> Year	7
Year	365 / 366

LY = Leap year

NLY = Non Leap Year

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→ Leap Year

- completely  $\div$  by 4

- beginning of a century will be leap year if its divisible by 400

eg. (i) 2000     $400) \overline{2000} \quad 5$

$$\begin{array}{r} -2000 \\ \hline 0 \end{array}$$

(ii) 1900

$400) \overline{1900} \quad 4$

$$\begin{array}{r} -1600 \\ \hline 300 \end{array}$$

X

$$7 \overline{)365} \quad 51$$

$$\begin{array}{r} 35 \\ 15 \\ \hline 14 \\ \hline 1 \end{array}$$

$$7 \overline{)366} \quad 51$$

$$\begin{array}{r} 35 \\ 16 \\ \hline 14 \\ \hline 2 \end{array}$$

$\Rightarrow \text{Ans} = 1, 2$

Q. Find no. of odd days in 10 years.

$$\begin{array}{ccc} 10 \text{ Years} & & \\ \searrow & & \downarrow \\ 2 LY & & 8 NLY \\ \times 2 \text{(odd days)} & & 8 \times (\text{odd days}) \\ = 4 & & = 8 \end{array}$$

$$\begin{array}{c} 7 \overline{)42} \\ -49 \\ \hline 5 \end{array} \rightarrow \underline{\text{Ans}}$$

Note: No. of 'odd days' in 'X' years ( $X < 100$  years)

$$= \left( X + \frac{X}{4} \right) \text{ odd days} \quad (\because \text{of leap year})$$

$$= 10 + \frac{10}{4}$$

$$= 10 + 2 = 12 \text{ odd days}$$

Q.5 Is 200<sup>th</sup> year a leap year?

Sol<sup>n</sup>:

$$\frac{200}{400} \neq \text{leap year}$$

Q.6 Find odd days in 100 years?

Sol<sup>n</sup>:

$$\begin{array}{c} 100 \\ \swarrow \quad \searrow \\ 76 \quad 24 \\ (\text{NLY}) \quad (\text{LY}) \end{array} \quad (100^{\text{th}} \text{ will not be a leap year})$$

$$\text{Odd days } 76 + 48$$

$$7 \overline{) 124} (17$$

$$\begin{array}{r} 7 \\ 54 \\ \hline 49 \\ \hline 5 \end{array}$$

~~ans~~

Q.7 No. of odd days in 100 yrs = 5.

No. of odd days in 200 years = 3

No. of odd days in 300 years = 1

No. of odd days in 400 years = 0

odd days

$$(5 \times 2) \div 7 = 3$$

)

$$(5 \times 4) + 1 \div 7 =$$

In every 400 yrs odd days = 0

Q.7. Find odd days in 546 years.

$$\begin{array}{c} 146 \\ \swarrow \quad \searrow \\ \text{LY} \quad \text{NLY} \end{array}$$

$$4 \overline{) 146} (32$$
  
$$\begin{array}{r} 12 \\ 26 \\ \hline 24 \\ \hline 2 \end{array}$$

six<sup>15</sup>

$$546 = (400 + 100 + 46) \text{ years}$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$0 + 5 + \left( \frac{46+46}{4} \right) \text{ odd days}$$

$$= 5 + 46 + 11$$

$$= 62$$

$$\text{odd days} = 62 \div 7$$

$$\text{odd days} = 6$$

Find odd days in 1949 years?

$$1600 + 300 + 49$$

$$4 \times (0) + 1 + \left( 49 + \frac{49}{4} \right)$$

$$\begin{array}{r} 50 + 12 \\ \hline 62 \end{array}$$

$$= 6 \text{ odd days}$$

$$\begin{array}{r} 16368 \\ 56 \\ \hline 6 \end{array}$$

*Years*

The last date of 1949 year = 31<sup>st</sup> Dec 1949  
= Saturday

without Reference

Odd Days	Date
0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

Q9. Which day will be odd days till 1949  
(31<sup>st</sup> Dec 1949)

Soln: Well calculate odd days  
= 6 odd days

26 ~~odd~~ days → 5 odd days

total = 11 odd days

= 6 odd days = Thursday

Q8 total days =  $26 + 6 = 32$

$$7 \overline{) 32} \quad 4$$

28

4 odd days

= Thursday

\* Q10. Which day will be on 4<sup>th</sup> July 2010?

Soln: 2010 = 2000 + 10 ~~odd~~

$$= 5 \times 0 + 10 \frac{+ 10}{2} = 0 + 10 = 10 \text{ odd days}$$

Jan = 31 3 Apr = 30 2 July = 4 ✓

(NLY) Feb = 28 0 May = 31 3

March = 31 3 June = 30 2

odd days = 17 ~~0~~

~~Total =  $63 + 28 + 60 + 4$~~

~~$= 155$~~

Total =  $\frac{22}{0}$  odd day

~~Days =  $155 + 5 = 160$  days~~

~~$7 \overline{) 160} \quad 22$~~

~~$\frac{14}{20}$~~

~~$\frac{14}{6}$~~

~~$= 08$  at~~

~~$7 \overline{) 22} \quad 3$~~

~~$\frac{21}{1}$~~

~~= Monday~~

## Category 2 : With Reference

4<sup>th</sup> July 2011 = Monday

4<sup>th</sup> July 2012 = ?

4<sup>th</sup> Jul 2010

4<sup>th</sup> July 2012

1) full 1 year

1 odd  
day

2 odd  
day

∴ 2012 is a LY

Monday + 2 = Wednesday

Find 4<sup>th</sup> July 2008 ?

Diff = 5 years = 5 odd days

(No leap  
year b/w  
Feb 2007  
to Feb 2011)

∴ Friday

2011 → Feb = 28  
2010 → Feb = 28

= Monday - 3 odd days

2010 → Feb = 28  
2009 → Feb = 28

$$1 - 3 = -2 + 7 \\ = 5$$

2009 → Feb = 28  
2008 → Feb = 28

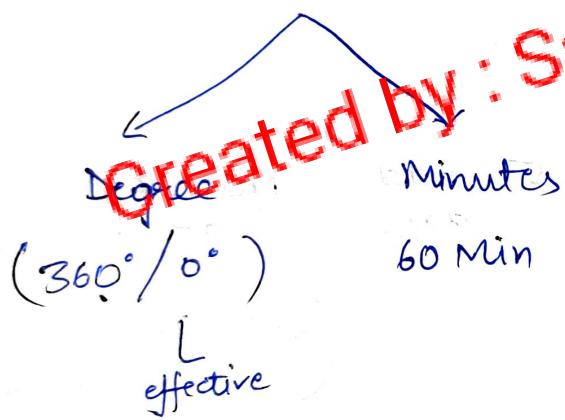
= Friday

(07)

## CLOCKS

- Time given find  $\angle$  b/w min & hr hand
- Angle given ; find exact time.
- Time  $\begin{cases} \rightarrow \text{Dist} \\ \rightarrow \text{Speed} \end{cases}$

### # DISTANCE



Angle	mins
$360^\circ$	60 min
$180^\circ$	30 min
$90^\circ$	15 min
$0^\circ$	0 min

### # Rotational Speed

(i) minute hand

$$\text{in } 60 \text{ min} \rightarrow 360^\circ$$

$$1 \text{ min} \rightarrow \frac{1}{60} \times 360^\circ$$

$$1 \text{ min} = 6^\circ$$

In 12 hrs  $\rightarrow$  360°

$$1 \text{ hr} \rightarrow 30^\circ$$

60 min  $\rightarrow$  30°

$$1 \text{ min} \rightarrow \frac{1}{2}^\circ$$

Angular Gain / Space gain (b/w hr & min)  
hand

$$\begin{aligned} \text{space gain} &= \text{Dist(m)} - \text{Dist(h)} \\ (\text{in } 1 \text{ min}) &= 6^\circ - \frac{1}{2}^\circ \end{aligned}$$

$$\text{space gain} = 5\frac{1}{2}^\circ$$

$$\begin{aligned} \text{space gain (in 60 min)} &= 5.5^\circ \times 60 \\ &= 330^\circ \end{aligned}$$

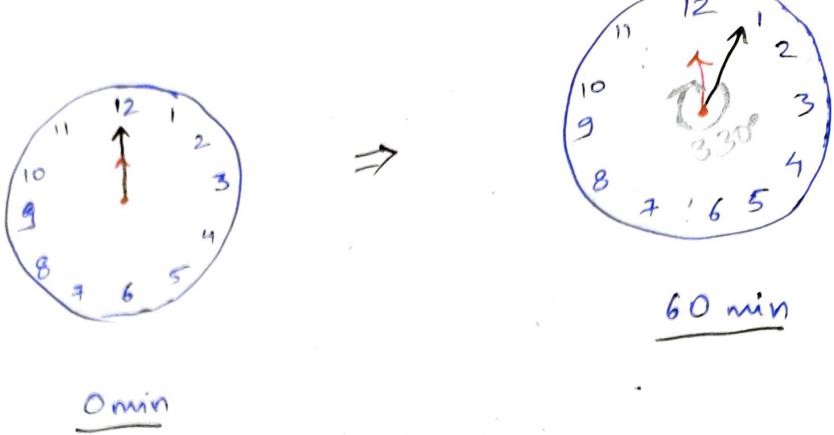
$$\underline{\underline{\text{Dist(m in 60 min)} - \text{Dist(h in 60 min)}}}$$

$$= 360^\circ - 30^\circ$$

$$\text{space gain} = 330^\circ$$

hour

$$\begin{cases} 12 \text{ h} \rightarrow 360^\circ \\ 1 \text{ h} \rightarrow 30^\circ \end{cases}$$



$$330^\circ \div 55 \text{ min}$$

# Space Gain =  $\frac{\text{Dist (m)}}{\text{Dist (H)}}$

(in 1 hr)  $\therefore \approx 60 \text{ min} - 5 \text{ min}$   
 $\approx 55 \text{ min}$

⇒ CONCLUSION  
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- If  $55$  min of space gain is achieved in  $60$  min ~~60~~

- so for  $15$  min of space gain is achieved in  $x$  min

$$= \frac{15}{55} \times 60$$

$$1 \rightarrow \frac{60}{55}$$

$$= \frac{12 \times 15}{11}$$

$$15 \rightarrow \frac{60}{55}$$

$$= \frac{180}{11}$$

$$= 16 \frac{4}{11} \text{ min}$$

12 × [5(3) ± 0]  
11  
↓  
for formula