

# Series / Coding Decoding / Character Puzzle

- ~~Series~~ Series
  - Difference, Multiplies
  - Calendar (consider leap)
  - Prime no. difference (3, 5, 7, 11, 13, 17) (no 9)
  - Alternate patterns
  - Sandwich

## Coding Decoding

• Identify common

• Alphabet

E J O T Y

S 10 15 20 25

## Character Puzzle



- vertical
- horizontal
- cross blocks

## General Mental Ability

counting of squares

1	2	3
2		
2		

column rows

N x N figure

$$\rightarrow (N \times N) + (N-1)(N-1) + (N-2)(N-2) + \dots$$

eg 3 x 3  $\Rightarrow (3 \times 3) + (2 \times 2) + (1 \times 1)$   
 $= 9 + 4 + 1 = 14$  squares

→ N x M figure

$$= (N \times M) + (N-1)(M-1) + (N-2)(M-2) + \dots$$

eg 5 x 3  $\neq$  till one value zero  
 $4 \times 2 + 3 \times 1 + 2 \times 0$

$$15 + 8 + 3 + 0 = 26$$

Counting of Rectangles  
 or Parallelogram

N x N :-  $(1+2+3+\dots+N) \times (1+2+3+\dots+N)$

eg 3 x 3 :-  $(1+2+3) \times (1+2+3)$

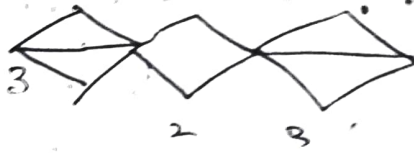
$$= 6 \times 6 = 36 \text{ rectangles}$$

N x M :-  $(1+2+3+\dots+N) \times (1+2+3+\dots+M)$

Incomplete figure  $\rightarrow$  manual counting  $\rightarrow$  sequence  $\bar{E}$  possible  $\rightarrow$  1-step  $\rightarrow$  2-step  
 $\downarrow$   
 3D  $\rightarrow$  front + back

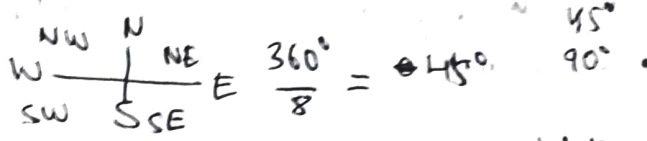
No. of routes

- multiply



$$3 \times 2 \times 3 = 18$$

**Direction Sense**



Pythagorean



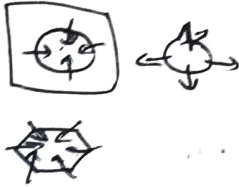
$$H^2 = P^2 + B^2$$

P. Triplets

	P	B	H
→	4	3	5
→	12	5	13

**Seating arrangement**

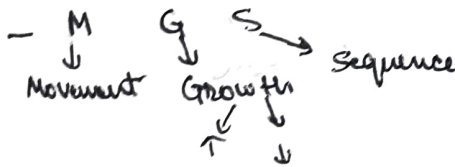
- 1. Linear
- 2. circular
- 3. Polygon



if not mentioned (facing center)

**Non Verbal Reasoning**

Picture Reasoning



**Number Ranking**

Method,

$$Ranking_{start} + R_{last} = T_N + 1$$

(Total no.)

$$Ranking_{left} + R_{last} = T_N + 1$$

$$R_{top} + R_{bottom} = T_N + 1$$

Method diagram

eg Row is 11th from top in 40



40

A is 11th from top so but A is 29 + 1 = 30th from bottom

Updated

### Divisibility

- ÷ 2 last digit div by 2
- ÷ 4 last 2 digits div by 4
- ÷ 8 last 3 digits div by 8

### Number System

- ÷ 3 sum of digits is div by 3
- ÷ 9 sum of digits is div by 9
- ÷ 5 last is 5 or 0
- ÷ 10 last is 0

### Factors/Divisors

- perfect squares
- 12 → 1, 2, 3, 4, 6, 12 (6 factors)
  - 24 → (1, 2, 3, 4, 6, 8, 12, 24) (8 factors)
  - 36 → 1, 2, 3, 4, 6, 9, 12, 18, 36 (9 factors)
  - 32 → (1, 2, 4, 8, 16, 32) (6 factors)

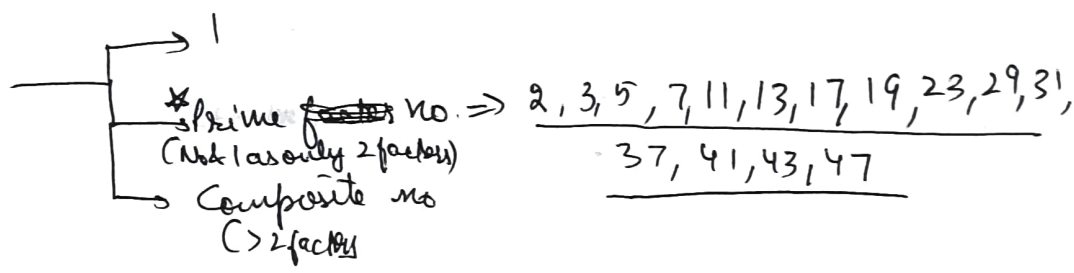
# No of factors of a perfect square are always odd  
 # No. of factors of nonperfect square are always even

eg. How many no less than 30 we have & such that they have 3 factors  
 Ans: 3 factors means perfect square so < 30 perfect square are

- 1 (1) ✗
- 4 (2, 4) (3) ✓
- 9 (3, 9) (3) ✓
- 16 (2, 4, 8, 16) (5) ✗
- 25 (5, 25) (3) ✓

So, Three no.

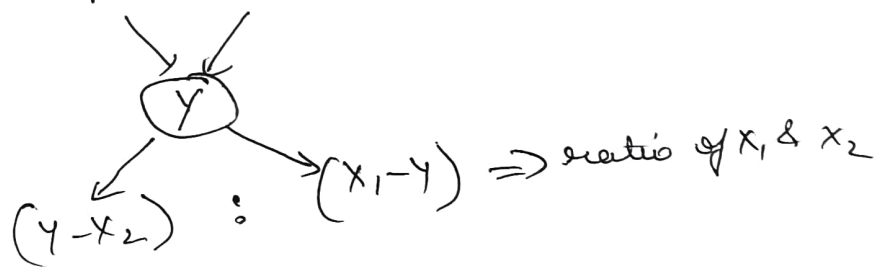
Natural No



### Mixtures

use allegation

100% one  $X_1$       100% other  $X_2$



### LCM (Least Common Multiple)

2	6, 7, 8, 9, 12
3	3, 7, 4, 9, 6
2	1, 7, 4, 3, 2
	1, 7, 2, 3, 1

LCM = 504

Inc

## Two Digit No

	0	9	18	27	36	45	54	63	72
add 11	11	21	31	41	51	61	71	81	91
	22	32							
	33								

$21 - 12 = 9$   
 $31 - 13 = 18$

diagonal  
odd 11

	18	reverse
9	21	31
11	22	32
12	23	33
13	24	34
14	25	35
15		
16		
17		
18		
19		
20		

another 2 digit no

2 digit No

Remainder will never be  $> 50$

A two digit no when divided by another 2 digit no will never give you remainder  $> 50$

## Arithmetic Progression

Common difference

$$T_n = a + (n-1)d$$

$$\text{sum} = \frac{n}{2} (2a + (n-1)d)$$

odd eg

3, 5, 7, 9, 11

even

3, 5, 7, 9, 11, 13

Average  $\Rightarrow$  Mid point of these 2 terms

Middle term is average

UP  
5.5.1

decimal / fraction / % age

Percentage

$$\% = \frac{1}{100}$$

$$\frac{1}{1} = 100\% = 1.00$$

$$\frac{2}{1} = 200\% = 2.00$$

$$\frac{1}{2} = 50\% = 0.50$$

$$\frac{2}{2} = 100\% = 1.00$$

$$\frac{1}{3} = 33.33\% = 0.33$$

$$\frac{2}{3} = 66.66\% = 0.66 ; \frac{3}{3} = 100\% = 1.00$$

$$\frac{1}{4} = 25\% = 0.25$$

$$\frac{2}{4} = 50\% = 0.5$$

$$\frac{3}{4} = 75\% = 0.75 ; \frac{4}{4} = 100\%$$

$$\frac{1}{5} = 20\% = 0.20$$

$$\frac{2}{5} = 40\% = 0.40$$

$$\frac{3}{5} = 60\% = 0.6$$

$$\frac{4}{5} = 80\% = 0.8$$

$$\frac{1}{6} = 16.66\%$$

$$\frac{2}{6} = 33.33\%$$

$$\frac{3}{6} = 50\%$$

$$\frac{4}{6} = 66.66\%$$

$$\frac{5}{6} = 83.33\%$$

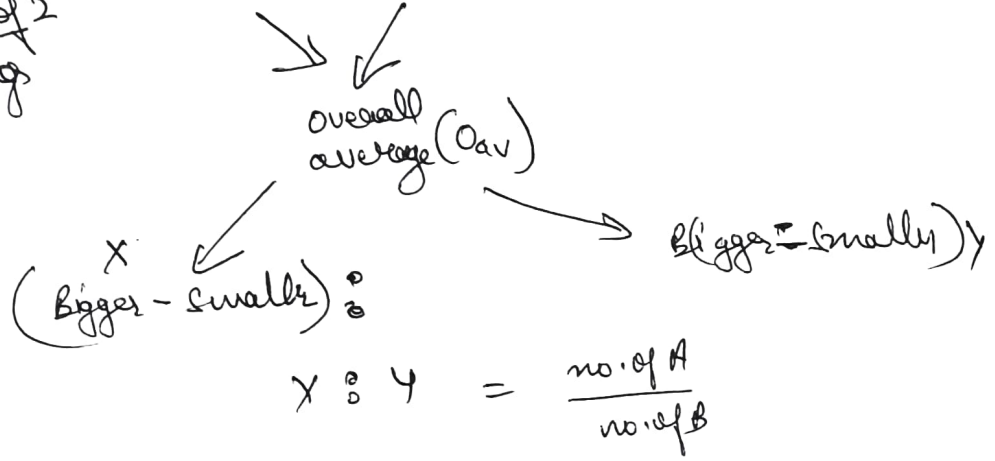
$$\frac{1}{7} = 14.28\%$$

$$\frac{1}{8} = 12.5\%$$

Allegation

A  
Aav.  
B  
Bav.

Mixture of 2 things



# Ratio & Proportion

- Simply

$$100 = 7 \times 11 \times 13$$

143

- can try ans option

$$\frac{\text{Income} - \text{Exp. Sav}_1}{\text{Income} - \text{Exp. Sav}_2} = \frac{Ex_1}{Ex_2}$$

Don't keep two  
come things on  
separate side  
include it in creation  
of ratio

eg  $4x - 3y = 6000$   
 $5x - 2y = 6000$

ratio  $\frac{4x - 6000}{5x - 6000} = \frac{3}{2}$

## Profit and Loss

$$\text{P\% / L\%} = \frac{SP - CP}{CP} \times 100\%$$

+ Profit  
- Loss

When SP of 2 articles same → on one x% Profit & other x% loss  
What is overall P or loss =  $\frac{-x^2}{100}\%$  (loss) always

- Discount calculated on Marked Price

- You can start let it be 100

- when we sell it at 40% <sup>profit</sup> if sale same at 20%  
then x% loss, actual GP ⇒ Middle value of 40 & 20 i.e. 30

# Ages

Q: Age of Mr. X last year was square of no & it would be cube of no. next year, what is the least no. of years he must wait for his age to become cube of a no. age?

Ans:-

$$1^2 \quad 2^2 \quad 3^2 \quad 4^2 \quad \dots$$

$$1 \quad 4 \quad 9 \quad 16 \quad \dots$$

$$1^3 \quad 2^3 \quad 3^3 \quad 4^3 \quad \dots$$

$$\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array} ?$$

$$\begin{array}{r} 27 \\ -2 \\ \hline 25 \end{array} \rightarrow 5^2$$

64 → Next cube

$$\begin{array}{r} 25 \quad 27 \\ \downarrow \\ \text{his age is} \\ 26 \end{array}$$

$$64 - 26 = 38$$

## Arithmetic Progression

1st term = a

Common difference = d

Term no.  $N^{th}$

$$\text{Sum} = \frac{N}{2} [2a + (N-1)d]$$

$1 \text{ m}^3 = 1000 \text{ L (water)}$

Q: Two pipes A & B can independently fill a tank completely in 20 & 30 min respectively. If both pipes are opened simultaneously, how much time will they take to fill the tank completely?

Ans:-  $\frac{1}{x} = \frac{1}{20} + \frac{1}{30}$

$$\frac{1}{x} = \frac{3+2}{60} = \frac{5}{60}$$

$$x = 12 \text{ min}$$

A → 20 min  
B → 30 min

Take LCM = 60 Ltr is capacity of Tank

$$A = \frac{60}{20} = 3 \text{ L/min}$$

$$B = \frac{60}{30} = 2 \text{ L/min}$$

$$A+B = 5 \text{ L/min}$$

$$\frac{T.C}{\text{per min}} = \frac{60}{5} = 12 \text{ min}$$

Ram & Shyam work on a job together for 4 days & complete 60% of it. Ram takes leave then Shyam works for 8 more days to complete the job. How long would Ram take to complete entire job?

Ans: - Find per day capacity

(RTS) 60%

per day RTS:  $\frac{60\%}{4} = 15\%$

Shyam  $\Rightarrow 40\%$

8 days

1 day =  $\frac{40}{8} = 5\%$

- So Ram capacity per day is 10%

- So in 10 days Ram can do complete work

Speed

$$S = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{\text{Relative Distance}}{\text{Relative Time}}$$

Calendar

- Yearly navigation
- Monthly navigation
- Date navigation  $\Rightarrow$

complete weeks + days  
(divide by 7)  
odd days

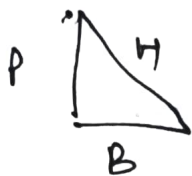
Same date

Jan	
Feb	
March	
April	$\rightarrow 2$
May	3
June	2
July	3
August	3
Sept	2
Oct	3
Nov	2
Dec	3

NY



# Geometry & Mensuration



P	B	H
3	4	5
5	12	13

Cube

Total area  $6a^2$   
 LSA  $= 4a^2$

Cylinder



Volume  $= \pi r^2 H$   
 LSA  $= 2\pi r h$   
 TSA  $= 2\pi r(r+h)$

Cuboid

Vol  $= L \times B \times H$



$D = \sqrt{l^2 + b^2 + h^2}$

Circle

Circumference  $= 2\pi r$   
 Area  $= \pi r^2$

~~Pyramid~~

Sphere

~~LSA~~  
 $4\pi r^2$   
 $\frac{4}{3}\pi r^3$