Num AR-01 Ber 1/5

→ Digital Root :- Nothing but add all the digit.

* Digital root of perfect square 1, 4, 7, 9

eg:- 1, 4, 9, 16, 25, 36 . . . .

* Not any prime number except 3 will have 3, 6 or 9 as it digital roots

eg:- 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37
2 4 8 1 5 2 4 1

Simplify:-

1) $1777 - 2349 - 1345 + 6523$

1777 = 1+7+7+7 = 22 = 2+2 = 4

2349 = 2+3+4 = 9 = 0

4 − 0 − 4 + 7 = 7

a) 4706 = 8

b) 4606 = 7

c) 4876 = 8

d) 4176 = 9

2) $5016 \times 1001 - 333 \times 77 + 22 = ? \times 11$

3 2 0 5 4 $\square^2$

a) 435510 = 6

b) 454127 = 5

c) 527240 = 2

d) 366531 = 6

$3 \times 2 - 0 \times 5 + 22 = \square^2$

$6 + 22 = \square^2$

$28 = x^2$

$x = 14 = 5$

3) $\overbrace{2387}^{} - 123 + 980 =) - 145 + 945$

$2 - 6 + 8 = x - 1 + 0$

$4 = x - 1 \Rightarrow \boxed{x = 5}$

a) 2244 (3) , b) 2355 (6) , c) 2434 (4) , ~~d)~~ 2444 (5)

4) 135% of 342 − 342·1 of 15·3

0

a) 411·13 b) 412·23 c) 414·43 ~~d)~~ 415·53

0

⇨ Squares of two digit number

(i) Ending with zero

(ii) Ending with 5

(iii) Ending with any other digits.

Q:-

(ii) Ending with 5

$(15)^2 = 225$

1 × 2 | 25

2 | 25

$(25)^2 = 625$

2·3 | 25

6 | 25

$(35)^2 = 1225$

3·4 | 25

12 | 25

$(45)^2 = 2025$

4·5 | 25

20 | 25

$(55)^2 = 3025$

$(65)^2 = 4225$

$(75)^2 = 5625$

c) (i) $(76)^2$

Square the each number

Multiple and double

Add both.

49 36

840

5776

(ii) $(28)^2$

4 64

320

784

(iii) $(73)^2$

49 09

1420

5329

(iv) $(66)^2$

36 36

720

4356

(v) $(51)^2$

25 01

100

2601

(vi) $(44)^2$

16 16

32

1936

(vii) $(97)^2$

81 49

126

9409

(viii) $(82)^2$

64 04

32

6724

⇨ Squares of 3 Digit numbers

(i) Less than 316 / greater than 317

(ii) Type A -> Rounding Off to less than nearest 10

Type B -> Rounding Off beyond 10.

Type A eg :- 203, 301, 412, 521

Type B eg :- 196, 291, 389, 492

* Less than 316 / greater than 317

→ $(316)^2$ will be a 5 digit number.

→ $(317)^2$ will be a 6 digit number.

Type A → Rounding off to less than nearst to

eg :- $(203)^2$

200 + 03 (Nearst to 200)

203 + 03 = 206

206 × 2

412

$(203)^2$ = 41 | 2 | 09 → square of 03

(ii) $(207)^2$ = 200 + 07 ⇒

207 + 07 ⇒ 214 × 2 = 428

$(207)^2$ = 42849.

(iii) $(303)^2$ = 300 + 03 ⇒ 303 + 3 = 306 × 3 = 918

$(303)^2$ = 91809

(iv) $(311)^2$ = 300 + 11 ⇒ 311 + 11 ⇒ 322 × 3 = 966

$(311)^2$ = 966 | 721

(v) $(223)^2$ = 200 + 23 ⇒ 223 + 23 ⇒ 246

246 × 2 = 492

$(223)^2$ = 492 -- / 529 / 49729

$(23)^2$ = 409 + 12 + 4 = 529

(vi) $(249)^2$ = 200 + 49 ⇒ 298

298 × 2 = 596

$(249)^2$ = 596 -- / 2401 / 62001

$(49)^2$ = 1681 + 4 = 2401

(vii) $(302)^2$ = 304 × 3 = 912

$(302)^2$ = 91204

Type - Rounding off beyond 50

(i) $(196)^2$ = 200 - 04 ⇒ 196 - 4 = 192 × 2 = 384

$(196)^2$ = 384 (16) ✓

(ii) $(254)^2$ = 300 - 46 ⇒ 254 - 46 ⇒ 208 × 3 = 624

$(254)^2$ = 624 ! 16 ⇒ 64516.

21

$(46)^2$ = 1636 + 4 + 16 = 2116

(iii) $(275)^2$ = 300 - 25 ⇒ 275 - 25 = 250 × 3 = 750

$(275)^2$ = 750 -- / 625 / 75625

⇒ Numbers greater than 317 (six digit number)

(i) $(913)^2$ = 900 + 13

$913 + 13 = 926$

$926 \times 9 = 8334$

$(913)^2$ = 8334 _ _ / 169

$(913)^2$ = 833569

(ii) $(956)^2$ = 1000 − 46 ⇒ 956 − 46 = 910

900 × 10 = 9000

$(46)^2$ = 16 36 / 48 / 2116

$(956)^2$ = 9000 _ _ / 2126

$(956)^2$ = 902126.

(ii) $(956)^2$ = 1000 − 44 ⇒ 956 − 44 = 912

912 × 10 = 9120

$(44)^2$ = 16 16 / 32 / 1936

$(956)^2$ = 9120 / 1936

$(956)^2$ = 913936

⇒ Divisibility Rules

2 → last digit is 0, 2, 4, 6 or 8.

3 → Sum of the digits is divisibly by 3.

4 → last two digits is divisible by 4.

5 → last digit is 0 or 5.

6 → Number is divisible by 2 and 3

7 → Double the value of the last digit and subtract the result from the rest of the number. The answer is divisible by 7.

8 → Last three digits of a number is divisible by 8.

9 → Sum of the digits is divisible by 9.

10 → last digit is 0.

11 → Modulus of odd - even digits leaves 0 or 11

12 → leaves 4 and 3.

443
25
468
268
200

Examples:- for 7

Steps :-(i) Divide the number in blocks of 3 from the right end

(ii) Addition & subtraction operators

(iii) Check divisible by 7

(i) $5|443|268|025$ (− + − +)

$|25 - 268 + 443 - 5| = 195$

$195 = 19\,(5\times 2)$ → double the last digit.

$= 19\,(10)$

$\Rightarrow 19 - 10 = 9$ → Subtract from the first two digits.

If this is divisible by 7 then the number is divisible by 7.

(ii) $34\underline{3} \Rightarrow 34-(3\cdot 2) = 34-6 = \underline{28}$ (Divisible by 7)

(iii) $2563\underline{7} \Rightarrow 2563-(14) \Rightarrow 2549 \Rightarrow 254-18 = 236$

$236 = 23-(12) = 11$ (not divisible by 7).

Divisibility rule for 11 (Diff b/w odd & even digits)

Q:- ⑤④⑨⑥⑥⑦①③②

$|(5+4+6+7+2)-(4+6+7+3)| = |24-20| = \underline{4}$ (Remainder)

Step 1:- Odd digits - Even digits in modulus.

Step 2:- If rem is 0 or 11, then it is divisible by 11.

* Find out divisibility rule for 24.

In order to do that you should consider Co-primes

Factors of 24 →

1	24	X
2	12	X
3	8	→ Co-primes (✓)
4	6	X

∴ Divisibility rule for 24 leaves rem of 3 & 8.

(ii) Find out divisibility rule for 12

Factors of 12 →

1	12	X
2	6	X
3	4	✓

⇨ Arithmetic progression.

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

$S_n = \frac{n}{2}[2a + (n-1)d]$

a = 1st term, d = common diff

t_n = n^{th} term, S_n = Sum of n terms

⇨ Geometric progression.

$t_n = ar^{(n-1)}$

$S_n = \frac{a(r^{n-1})}{r-1}$, when $r > 1$

$S_n = \frac{a(r^{n-1})}{1-r}$, when $r < 1$

$S_n = n \times a$, when $r = 1$

[a is 1st term
d is common ratio]

* Sum of first n natural numbers $= n(n+1)/2$

* Sum of the squares of first n natural numbers

$= n(n+1)(2n+1)/6$

* Sum of the cubes of first n natural numbers $= [n^2(n+1)^2]/4$.

* Sum of first n natural odd numbers $= n^2$.

⇨ HCF & LCM

(i) Find the greatest number that will exactly divide x, y & z.

→ Approach :- Required number = H.C.F of x, y & z.

(ii) Find the greatest number that will divide x, y and z leaving remainders a, b & c respectively.

→ Required number = H.C.F of $(x-a), (y-b)$ & $(z-c)$.

(iii) Find the least number that is exactly divisibly by x, y & z.

→ Required number = L.C.M of x, y & z

(iv) Find the least number which when divide by x, y & z leaves remainder a, b & c respectively.

→ $x-a = y-b = z-c = k$

Required number = (L.C.M of x, y, z) $- k$.

(v) Find the least number which is divided by x, y & z leave the remainder 'r'

→ Required number = (L.C.M of x, y, z) $+ r$.

(vi) Find the greatest number that will divide x, y and z leaving same remainder in each case

→ Required number = H.C.F of $(x-y), (y-z)$ and $(z-x)$.

H.C.F and L.C.M of Fractions

→ H.C.F of fractions = $\frac{\text{H.C.F of Numerators}}{\text{L.C.M of Denominators}}$

→ L.C.M of fractions = $\frac{\text{L.C.M of numerators}}{\text{H.C.F of Denominators}}$.

Examples.

Number	no. of factors
6	1, 2, 3, 6 = 4
7	1, 7 = 2
8	1, 2, 4, 8 = 4
10	1, 2, 5, 10 = 4
12	1, 2, 3, 4, 6, 12 = 6
52900	→ ?

If N is a number then $N = a^p \cdot b^q \cdot c^r \ldots$

No of factors $= (p+1)(q+1)(r+1)$

eg: (i) $6 = 2^1 \times 3^1 \Rightarrow (1+1)(1+1) = 2 \cdot 2 = 4$

(ii) $24 = 2^3 \cdot 3^1 \Rightarrow (3+1)(1+1) = 4 \cdot 2 = 8$

(iii) $480 \Rightarrow 2^4 \times 3^1 \times 2^1 \times 5^1 \Rightarrow 2^5 \times 3^1 \times 5^1 \Rightarrow 6 \cdot 2 \cdot 2$

* 0 can be written as $2^1 \times 5^1$ $= 24$.

If 00 it can be written as $2^2 \times 5^2$

(iv) 52900 =

00 = $2^2 \times 5^2 \times 23^2$

529 = Check the digital root to find if 529 is P.F

529 lies between 400 & 625

21st → last digit = 1

22nd → last digit = 4

23rd → last digit = 9

* Perfect square - If the total numbers of factors is a odd number, then given number is a perfect square.

Examples:-

(i) $54400 = 2^2 \times 5^2 \times 2^5 \times 17^1 \Rightarrow 2^7 \times 5^2 \times 17^1$

$54400 = (7+1)(2+1)(1+1) = 8 \cdot 3 \cdot 2 = 48.$

2 | 544
2 | 272
2 | 136
2 | 68
2 | 34
17

(ii) $577 \times 699 = (\text{Self}) \; 577^1 \times 699^1 \Rightarrow 2 \cdot 2 = 4$

(iii) $54400 \times 30600 = 2^4 \times 5^4 \times 2^5 \times 17^1 \times 2^3 \times 13^1 \times 5^1$

$\Rightarrow 2^{12} \times 5^5 \times 13^1 \times 17^1$

$\Rightarrow (13) \cdot (6) \cdot (2) \cdot (2) \Rightarrow 332.$

2 | 544
2 | 272
2 | 136
2 | 68
2 | 34
17 | 17
1

2 | 306
5 | 153
17 | 51
3 | 17
17

(iv) $444 \times 888 = 2^2 \times 3^1 \times 37^1 \times 2^3 \times 3^1 \times 37^1$

$\Rightarrow 2^5 \times 3^2 \times 37^2$

$\Rightarrow (5+1)(2+1)(2+1) = 6 \cdot 3 \cdot 3 = 54$

(v) $120 \times 240 \times 360 = 2^3 \times 5^3 \times 2^2 \times 3^1 \times 2^3 \times 3^1 \times 2^2 \times 3^2$

$\Rightarrow 2^{10} \times 3^4 \times 5^3 \Rightarrow 11 \times 5 \times 4$

$\Rightarrow 220.$

(vi) $(3230)^2 = 2^2 \times 5^2 \times 17^2 \times 19^2$

$\Rightarrow 3 \cdot 3 \cdot 3 \cdot 3 = 81.$

$27 \times 32 = 81$

$\Rightarrow$ To find the number of factors:

(i) Express the number as $N = a^p \times b^q \times c^r$

(ii) No of factors $= (p+1)(q+1)(r+1)$

(iii) Sum of the factors $= \left[\frac{a^{p+1}-1}{a-1}\right]\left[\frac{b^{q+1}-1}{b-1}\right]\left[\frac{c^{r+1}-1}{c-1}\right]$

(iv) Product of the factors $= N^{(p+1)(q+1)(r+1)/2}$

Eg for last digit:-

Calculate the last digit for $23 \times 34 \times 77 \times 32$.

$\Rightarrow 3 \times 4 \times 7 \times 2 = 168$

$\rightarrow$ 8 is the last digit.

$12 \times 14 = 84 + 84 = 168$

$\Rightarrow N = (xyz)^n$ z is even $= 6$

$n \div 4 \rightarrow R = 0 \rightarrow z$ is odd (except 5) $= 1$

$R = 1 \rightarrow z$

$R = 2 \rightarrow z^2$

$R = 3 \rightarrow z^3$

eg:- (i) $(23)^{267}$

4) 267 (66 $R = 3$,

24

27

24

(3) → R

$N = (xyz)^n$

$\Rightarrow (23)^3 = \underbrace{23 \cdot 23 \cdot 23}$

$3 \times 3 \times 3 = 27$

27
×3
81

∴ last digit of $(23)^{267}$ is 7

(ii) $(777)^{444}$

777 odd

4) 444 (111 There R = 0 & ~~no(aaa)~~ is ~~even~~

~~remainder = 0~~.

4 So, last digit = 1

04

04

(0) → R

(iii) $2^3 = 256$ (last digit = 6)

4) 8 (2 2 is even so, last digit = 6

8

(0) → R

* $z^n \rightarrow 2^8 = 256$

$2^9 = 512$, last digit = 2

2^{10} = Rem 2, last digit =

R = 0, z → even, 6

R = 1, $z^1 \rightarrow 2$

R = 2, $z^2 \rightarrow 4$

R = 3, $z^3 \rightarrow 8$

Last digit examples:-

(i) $(999)^{888}$ ⇒ 4) 888 (222 Rem (0)

(0)

999 → 9 is odd, so last digit = 1

(ii) $(544)^{689} \times (306)^{405}$

4) 688 (172 4) 405 (101

4 4

28 5

28 4

8 (1)

(0)

R = 0 R = 1

R = 0, 2' (even) 6 ; R = 1, ⇒ $(306)^1 = 6$

$6 \times 6 = 36$

∴ last digit = 6

(iii) $(445)^{925} \times (888)^{932}$

4) 925 (243 4) 888 (

8

17

16

15

12

(3)

R = 0 ⇒ 8 is even, last digit = 6

R = 3

$(445)^3 \Rightarrow 5^3 = 125$

last digit = 5

∴ overall last digit = $5 \times 6 = 30$

∴ Zero is last digit.

(iv) $(122)^{244} \times (244)^{366} \times (366)^{122}$

4) 244 (61
24
4
4
0

4) 366 (9
36
6
4
2

4) 122 (6
12
2

Rem = 0 Rem = 2 Rem = 2

2 is even ⇒ last digit = 6

$(244)^2$ ⇒ $4 \times 4 = 16$ ⇒ last digit = 6

$(366)^2$ ⇒ $6 \times 6 = 36$ ⇒ last digit = 6

⇒ last digit = $6 \times 6 \times 6$ ⇒ 6

36
×4
144

(v) $(32)^{22} \times (88)^{44} \times (66)^{66}$

$(32)^2 \times (88)^0 \times (66)^2$ ⇒ $4 \times 6 \times 6$ ⇒ $144 = 4$

⇨ Cubes of 2 Digit Number

(i) Ending with zero - 30, 40, $(50)^3 = 25000$

(ii) Starting with 1 - $(12)^3$

(iii) Ending with 1

(iv) Doublets

(v) Ending with any other digit.

(i) Ending with zero

eg:- $(20)^3 = 8000$, $(30)^3 = 27000$, $(50)^3 = 125000$

(ii) Starting with 1

eg:- $(12)^3$ = 1 2 4 8

1 → } → same
2 → }
4 → (2^2) Square
8 → (2^3) Cube

4 8

1 ← Double the center digits

1 7 2 8

$(12)^3 = 1728$

(ii) $(13)^3$ = 1 3 9 27 $(13)^3 = 2197$

② ②

6 18

2 1 9 7

⑤ ⑥

(iii) $(14)^3$ = 1 4 16 64 $(14)^3 = 2744$

① 8 32

2 7 4 4

(iv) $(19)^3$ = 1 9 81 729

5 31 72

18 162

6 8 5 9

$(19)^3 = 6859$.

(iii) Ending with 1

eg:- $(51)^3$ = 525 25 5 1

(2)(1) 50 10

(1) (1)

1 3 2 6 5 1

1 → 1 → same
5 → 5
25 → square of 2nd num
525 → square of 2nd num
Cube

$(51)^3$ = 132651

(ii) $(61)^3$ = 216 36 6 1

(10) 72 12

(1) (1)

226 9 8 1

$(61)^3$ = 226981

36 × 6 = 216

36 × 2 = 72

108

(iii) $(31)^3$ = 27 9 3 1

(2) 18 6

(1) (1)

29 7 9 1

$(31)^3$ = 29791.

72 × 3 = 216

36 × 3 = 108

(iv) Doublets :-

Cubes of number

eg:- $(22)^3$ = 8 8 8 8

2 16 16

(2) (1)

10 6 4 8

$(22)^3$ = 10648

(ii) $(33)^3$ = 27 27 27 27

(9) (8) 54 (2) 54

(1) (1)

36 2 3 7

$(33)^3$ = 36237.

27 × 2 = 54

27 × 3 = 81

54 + 27 = 81

27 × 3 = 81

27 × 2 = 54

81 + 54 = 135

(v) Ending with Any other Digit:

eg: $(32)^3$ = a^3 a^2b ab^2 b^3

a b

27 9·2 3·4 8

27 18 12 8

36 24

(1) (3)

32 7 6 8

$(32)^3 = 32768$

24
12
36

36
+8
44
+1
45

27
+5
32

⇨ Averages And Ages

1) Basic notations, Add/Remove items, Replacement, Average with Ages, Ages with Ratio, Framing equations with years.

→ Basic Notations and Average of Different Groups

eg:- A class A of 50 students scoring average marks of 45 and class B has 45 students scoring average marks of 50. What is the average of both classes together.

General way:- $45 = \frac{T_A}{50}$ $T_B = 45 \times 50$

$$\Rightarrow \frac{45 \times 50 + 45 \times 50}{45 + 45}$$

eg:- The avg weight of 17 girls is 20 kg and that of 23 boys is 22 kg. Find the weight of the class.

$$\Rightarrow \frac{17\times 20 + 23\times 22}{20+22} = \frac{846}{42} = 20.15$$

→ Addition or Removal Of Items

(i) Avg of new items added

$A +/- (1+N/n)x$.

(ii) Avg of items removed

$A +/- (1-N/n)x$.

Where, A = original average

N = original number of items

n = Number of items added or removed.

x = By which the avg is increased or decreased.

eg:- The average age of 40 students in a class is 15 years. When 10 new students are admitted, the average is increased by 0.2 year. Find the average age of the new students.

→ $A +/- (1+N/n)x$

$$15 + \left(1 + \frac{40}{10}\right) 0.2 \Rightarrow 15 + (5)0.2$$

$$= 15 + 1$$

$$= \underline{16}.$$

eg:- 2 : Avg salary of 15 teachers is 4500, 3 teachers left the school and the avg salary of remaining dropped by 175. Find the total salary of the teacher left out.

$A \pm \left(1 - \frac{N}{n}\right)x$ $\Rightarrow$ $4500 - \left(1 - \frac{15}{3}\right) \times 175$

$\Rightarrow$ $4500 - (1-5) \times 175$ $\Rightarrow$ $4500 + 700 = 5200$.

Total salary $= 5200 \times 3 = 15600$.

(iii) 50 boys in class. The Avg weight 45kg. 1 boy leaves reduced by 100 g. Find the weight of the boy who left the class.

$A \pm \left(1 - \frac{N}{n}\right)x = 45 - \left(1 - \frac{50}{1}\right) 100g$

$\Rightarrow$ $45 - (-49)\ 0.1\ 100g$ $\Rightarrow$ $45 + 4.9 = 49.9$

→ Replacement of Items:-

For N items in a group, Sum of new added − Sum of new item removed $= +/- Nx$.

eg:- A man weigh 80 kg is replaced by another man in a grp of 5, the avg weight is ↓ by 3kg. What is the weight of new man?

Added - Removed $= \pm Nx$

$A - 80 = -5 \times 3$

$A = -15 + 80$

$A = 65$ kg.

(ii) The avg weight of 15 students in a class is ↑ by 1.5, when one of the stud weight 40 kg is rep by a new stud. Find the weight of new stud.

Added - Removed = ± N x

$A - 40 = +15 \times 1.5 \Rightarrow A - 40 = 22.5 \Rightarrow A = 62.5$.

(iii) Avg weight of 8 ↑ by 2.5 kg, I person 65 kg, weight of new people

$A - R = \pm N x \Rightarrow$

→ Ages and Averages

Eg: The average age of husband, wife and their child 3 years ago was 27 years and that a wife and the child 5 years ago was 20 years. The present age of husband is ?

$$\frac{H-3 + W-3 + C-3}{3} = 27 \Rightarrow H-3 + W-3 + C-3 = 27 \times 3$$

$$H + W + C = 81 + 9 = 90$$

$$\frac{W-5 + C-5}{2} = 40 \Rightarrow \boxed{W + C = 50}$$

$$H = 90 - 50 = 40.$$

a) 35
b) 38
c) 39
d) 40

eg 2:- 5 years ago. Avg age of P & Q was 15, Avg age of P, Q & R is 20 now. How old will R be after 10 years

$P+Q = 15\times 2 + 10$ $\left(\frac{P-5+Q-5}{2} = 15\right)$

$P+Q = 40$

$P+Q+R = 20\times 3 \Rightarrow P+Q+R = 60$

$\therefore R = 60-40 = 20$

But after 10 years $= 20+10 = 30$.

→ Comparision of Ages

eg:- A's age 6 years back was half of the total of B & C's If C is 2 years older than B, what is A's present age.

$A-6 = \frac{1}{2}(B+C)$ $2A-12 = 2B+2C$

a) 20 b) 24 c) 27 d) CBD.

(ii) In 10 years, A will be twice as old as B was 10 years ago. If A is now 9 years older than B, then present age of B is

a) 35 b) 38 c) 39 d) 40

$A = 9+B$

$A+10 = 2(B-10) \Rightarrow A+10 = 2B-20$ $A-2B = -10$

→ Alligations

when even there are average's and ratios blended then you will use alligations.

⇒ Ratios :-

Bridge three Components

eg:- A : B = 4 : 5, B : C = 6 : 7, find A : C = ?

$$\frac{A}{B} = \frac{4}{5} \times \frac{B}{C} = \frac{6}{7} \rightarrow \frac{A}{C} = \frac{4}{5} \times \frac{6}{7} \Rightarrow \frac{A}{C} = \frac{24}{35}$$

$\therefore$ A : C = 24 : 35

(ii) $\frac{A}{B} = \frac{6}{7} : \frac{B}{C} = \frac{8}{9}$: A : B : C = ?

A : B = 6 : 7
B : C = 8 : 9

A : B : C = 48 : 56 : 63

(iii) BC : AC : AB = 1 : 2 : 3, Find A : B : C = ?

$\frac{AB}{BC} = \frac{2}{1}$; B : C = 3 : 2

A : B = 2 : 1
B : C = 3 : 2

A : B : C = 6 : 3 : 2

(iv) $\frac{1}{A} : \frac{1}{B} : \frac{1}{C}$ = 2 : 3 : 5, Find A : B : C = ?

A : B : C = $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$

A : B : C = 15 : 10 : 6

→ Bridge four components:-

eg:- given $A:B = 2:5$, $B:C = 3:1$, $C:D = 3:5$, find $A:B:C:D$

$A:B = 2:5$

$B:C = 3:1$

$C:D = 3:5$

$A:B:C:D = 18 : 5\times3\times3 : 5\times1\times3 : 5\times1\times5$

$A:B:C:D = 18 : 45 : 15 : 25$

(ii) Find the B's share in Rs 6300. if $A:B = 2:3$, $B:C = 4:5$ & $C:D = 3:7$

$A:B = 2:3$

$B:C = 4:5$

$C:D = 3:7$

$A:B:C:D = 2\times4\times3 : 3\times4\times3 : 3\times5\times3 : 3\times5:7$

$A:B:C:D = 24 : 36 : 45 : 105$

$8 : 12 : 15 : 35$

$$B's = \frac{12}{8+12+15+35} \times 6300$$

$$B's = \frac{12}{70} \times 6300 \Rightarrow 1080.$$

(iii) $A:B = 2:5$, $B:C = 4:3$; $C:D = 1:7$

$$\frac{2}{5} \times \frac{4}{3} \times \frac{1}{7} = \frac{8}{105}$$

→ Bridge four components:-

eg:- given A : B = 2 : 5, B : C = 3 : 1, C : D = 3 : 5, find A : B : C : D

A : B = 2 : 5
B : C = 3 : 1
C : D = 3 : 5

A : B : C : D = 18 : 5×3×3 : 5×1×3 : 5×1×5

A : B : C : D = 18 : 45 : 15 : 25

(ii) Find the B's share in Rs 6300. if A : B = 2 : 3, B : C = 4 : 5 & C : D = 3 : 7

A : B = 2 : 3
B : C = 4 : 5
C : D = 3 : 7

A : B : C : D = 2×4×3 : 3×4×3 : 3×5×3 : 3×5 : 7

A : B : C : D = 24 : 36 : 45 : 105 = 8 : 12 : 15 : 35

$$B's = \frac{12}{8+12+15+35} \times 6300$$

$$B's = \frac{12}{70} \times 6300 \Rightarrow 1080.$$

(iii) A : B = 2 : 5, B : C = 4 : 3; C : D = 1 : 7

$$\frac{2}{5} \times \frac{4}{3} \times \frac{1}{7} = \frac{8}{105}$$

(iv) Two numbers are in the ratio 3:5, if 9 is subtracted from each, the new number are in the ratio 12:23, then the smaller number is

a) 27 b) 30 c) 33 d) 36.

$$\frac{3x-9}{5x-9} = \frac{12}{23} \Rightarrow \frac{23(3x-9)}{12(5x-9)} = \frac{69x-207}{60x-108}$$

(v) Ratio = 5:7:8, Increased seats by 40%, 50% & 75%.

Find out the ratio of seats.

$$5 \times 140 : 7 \times 150 : 8 \times 175$$

$$20 \qquad\qquad 25$$

$$100 : 150 : 200$$

$$2 : 3 : 4.$$

(vi) Ratio A:B = 3:4, Ratio of monthly exp = 4:5.

Find the ratio of their monthly savings, if the savings of A is 1/4th of Income.

$I_A = 300$

$S_A = \frac{300}{4} = 75$

$E_A = 300 - 75 = 225$

$I_B = 400$

$S_B = \frac{400}{4}$

$E_B = 400 - \frac{400}{4} \Rightarrow \frac{1125}{4}$

$4:5 = 225 : E_B$

$\Rightarrow \frac{75 \times 4}{475} = \frac{12}{19}$

$E_B = \frac{1125}{4}$

⇨ Partnership

→ If there are two people

⇨ Blood Relations +ve / -ve (Male) (Female)

1) Gender - Male & Female (+ -)

2) Generation
   - Gr-2 (Grand parents)
   - Gr-1 (Anty, Uncle, mother, father ...)
   - Gr 0 (Brothers, Cousions, spouces,
   - Gr 1 → (Sons, kids, daughter, nephew, neice)

Question - Types :-

(i) Pointing a picture / person
(ii) Paragraph - small data's
(iii) Paragraphs - Large data's
(iv) Defined operators
(v) Different sets of verticals of data.

Notations :- A is the brother of B

B → A+

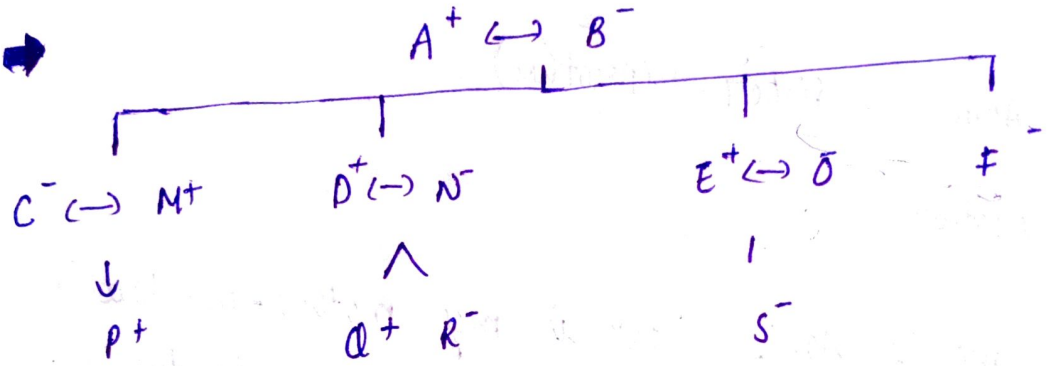
A is the father of B

A+
↑
B

(ii) A is the daughter of B

B
↓
A^-

(iv) Couple (Imagine) $A^+ \leftrightarrow B^-$



No of males = 6

No of Couples = 4

Question :- How is P related to B.

Ans :- P is the Grandson.

(ii) How is O related to A.

Ans :- Daughter in law

(iii) How is m related to F

Ans Brother in law

(iv) How is F related to P

Ans Maternal Aunt.

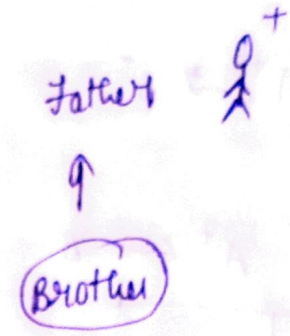
| Q related F |
Nephew.

| O related D |
Sister in law

| P related S |
Cousin.

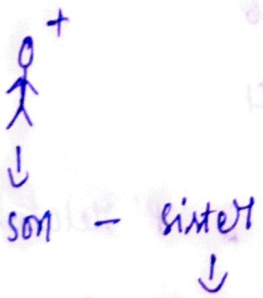
→ Pointing a picture / Person

Eg: Arun said "He is the only son of the father of my sister's brother". How is that person related to Arun.



Ans :- Brother

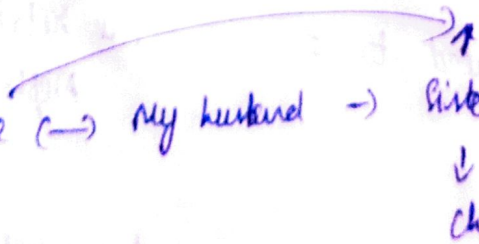
(ii) "This man's son's sister is my mother-in-law". How's women husband related to a man in the photograph



Ans :- Grandson

(iii) He is maternal grandfather of children of my husband's sister. How is the man related to the women

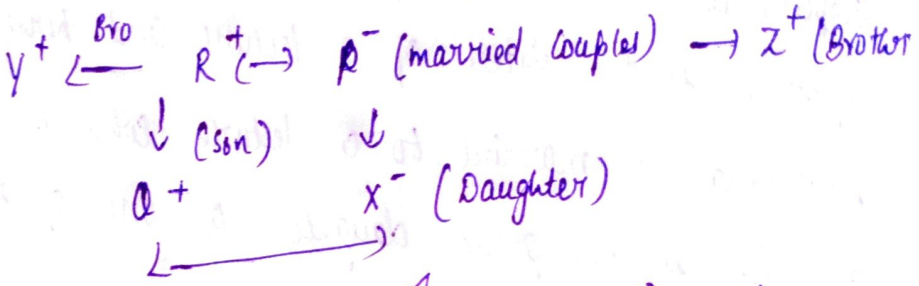
Ans



(iv) His mother is the wife of my father's son. Brother and sister I have none

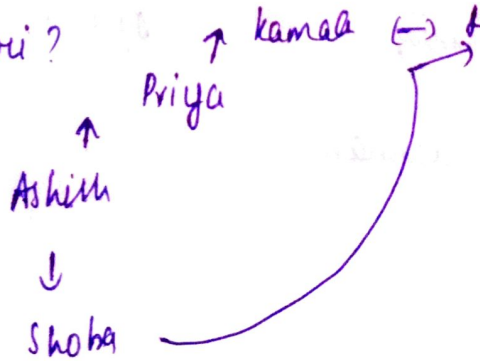
→ Paragraphs - Small Data's

eg:- A family consists of six members P, Q, R, X, Y and Z. Q is son of R but R is not mother of Q. P and Q are married couple. Y is the brother of R. X is the daughter of P. Z is the brother of P. How is Q related to X



a) Husband b) Father c) Brother d) uncle.

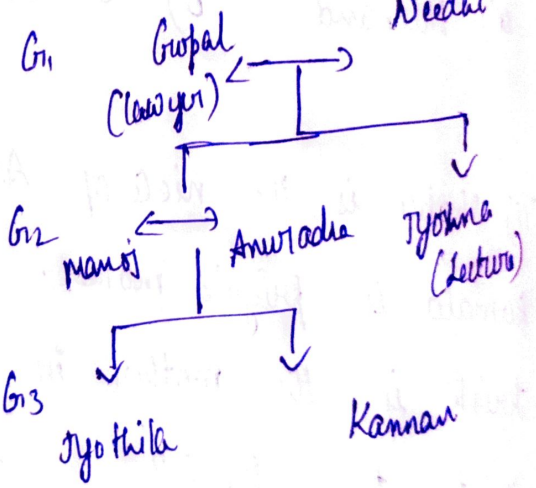
(ii) Shoba is the niece of Ashish. Ashish mother is Priya. Kamala is Priya's mother. Kamala's husband is Hari. Krish is the mother-in-law of Hari. How is Shoba related to Hari?



a) Daughter
b) Great grand daughter
c) Grand niece.

→ Paragraph's large data:

eg:- In a family of seven, three generations are living together. The family consists of two married couples having two children. Kannan is Jyothika's elder brother. Gopal is lucky to have two grand children. There are two housewives in the family. Gopal, who is manoj's father, is a lawyer and earn's more. Jyotsna is the sister of a lecture and herself is a nurse. Anuradha is married to a lecture who is Nidhi's son. Jyothika is the grand daughter of one of the housewives and is a classical dancer.



(i) What is manoj's profession

A) Lecture

(ii) How many male members are there in family

A) Gopal, Manoj & Kannan

Total = 3

(iii) who are needhi's children

A) Gopal & Needhi
(Lawyer)

iv) Which of the following statements is not true

a) The nurse is sister in law of the house wifes

b) Gopal has a two grand Children

c) Widhi has a son and a daughter

d) Gopal has two Children

e) Anuradha has a son and a daughter

→ Defined Operators

A+B means A is the son of B

A-B means A is the wife of B

A x B means A is the brother of B

A/B means A is the mother of B

A=B means A is the sister of B.

→ They will give

eg:- (i) What does P+R-Q mean?

P+ → R- ⟷ Q-

Q is the the father of P.

(ii) what does P x R/Q mean

Brother Mother.

(BODMAS) ←

P+ → R-

↓

Q.

P is uncle of Q.