GENERAL APTITUDE

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HCF & LCM

HCF / GCF(Highest/Greatest Common Factor)

- HCF of two or more numbers is the greatest / largest / highest/biggest number which can divide those two or more numbers exactly.

Factors of 6 : 1, 2, 3, 6

Factors of 8 : 1, 2, 4, 8

Common 1 & 2 Highest & Common 2

- **LCM(Least Common Multiple)**
- The LCM of two or more numbers is the smallest / lowest / least number which is exactly divisible by those two or more numbers.

Multiples of 6 : 6, 12, 18, 24, 30, 36, 42, 48, 54,…

Multiples of 8 : 8, 16, 24, 32, 40, 48, 56, 64….

Common 24, 48, …. Lowest & common 24

HCF (Factorization method)

- Eg. HCF for 136, 144, 168

2	136	144	168
2	68	72	84
2	34	36	42
	17	18	21

NO FURTHER COMMON FACTOR

So HCF = 2 x 2 x 2 = 8

Note : HCF is always <= the smallest of given numbers

HCF (Factorization method) - (Assignment)

- HCF of 54,72,126 (factorization method)

A. 21 B. 18 C. 36 D. 54

Ans : B

HCF (Difference Method)

- Find HCF of 203,319

Keep smaller here

- (203, 319)
- (116,203)
- (87,116)
- (29,87)
- (29,58)
- (29,29)

HCF =29

HCF (Difference Method) - (Assignment)

- HCF of 161,253 (difference method)

A. 27 B. 18 C. 23 D. 17

Ans : C

HCF (Difference Method)

Q. Find HCF of 84,125

- (84,125)
- (41,84)
- (41,43)
- (2,41)
- (2,39)

- If nothing is common then HCF =1 and numbers are said to be co prime numbers.

HCF & LCM

Q. Find the greatest number which can divide 284, 698 &1618 leaving the same remainder 8 in each case?

A. 36 B. 46 C. 56 D. 43.

Soln-

Remainder 8 → (numbers – 8) would be exactly divisible.

→284-8 = 276

→698-8 = 690

→1618-8 = 1610

→Greatest number dividing above 3 = HCF(276, 690, 1610) (difference method)

→HCF = 46

Ans: B

Q. Find the greatest number which can divide 62, 132 & 237 leaving the same remainder in each case?

A. 35 B. 46 C. 56 D. 43.

Soln:-

If two numbers a & b are divisible by a number n then

→ Their difference (a-b) is also divisible by n.

→132-62 = 70

→237-132 = 105

→237-62 = 175

→Greatest number dividing above 3 = HCF(70, 105, 175)

→HCF = 35

Ans: A

HCF & LCM

Q. Find the largest number such that 43,65,108 are divisible by that number and we get the remainder as 1,2,3 respectively in each case?

A. 21 B. 27 C.42 D. 63

Soln:

→ (numbers – remainder) would be exactly divisible.

→ 43 – 1 = 42

→ 65 – 2 = 63

→ 108 – 3 = 105

HCF(42,63,105)=21

Ans : A

Q. A teacher has 25 books, 73 pens & 97 erasers. She wants to distribute them equally to maximum number of students so that after distribution she has equal number of books, pens & erasers left. What is the maximum number of students for such a distribution?

A. 32 B. 21 C. 12 D. 24

Soln:-

If two numbers a & b are divisible by a number n then

→ Their difference (a-b) is also divisible by n.

→73-25 = 48

→97-73 = 24

→97-25 = 72

→Greatest number dividing above 3 = HCF(72, 48, 24)

→HCF = 24

Ans: D

HCF & LCM(Assignment)

Q. Find the greatest number which can divide 62, 132 & 237 leaving the same remainder in each case?

A. 35 B. 46 C. 56 D. 43.

Ans : A

HCF & LCM(Assignment)

Q. Find largest number such that if 45,68 and 113 are divided by that number we get the remainder as 1,2 and 3 respectively.

A. 21 B. 22 C. 26 D. 24

Ans: B

HCF & LCM(Assignment)

Q. Find the greatest number which can divide 41, 131 & 77 leaving the same remainder in each case?

A. 28 B. 18 C. 36 D. 24

Ans : B

LCM

- Eg. LCM for 18, 28, 108, 105

2	18	28	108	105
2	9	14	54	105
3	9	7	27	105
3	3	7	9	35
3	1	7	3	35
5	1	7	1	35
7	1	7	1	7
Till all quotients are 1	1	1	1	1

So LCM = 2 x 2 x 3 x 3 x 3 x 5 x 7 = 3780

<u>Note :</u> LCM is always >= the greatest of given nos

LCM(Assignment)

Q. LCM for 12,24,20

A. 210 B. 180 C. 120 D. 144

Ans : C

LCM (Assignment)

Q. Find LCM of 72,125

A. 9000 B. 1200 C. 1000 D. 800

Ans : A

Rules to Remember

- Product of two given numbers is equal to the product of their HCF & LCM

  A x B = HCF(A,B) x LCM(A,B)

- If a, b, c are three numbers that divide a number n to leave the same remainder r, the smallest value of 'n' is

  n = (LCM of a, b, c) + r e.g 3,4,5 & rem 1

LCM

Q. Find LCM of 147 & 231

Soln:-

- As we know,
- **HCF X LCM = product**
- Find HCF by difference method
- Put in the formula,
- 21 x LCM = (147 x 231)
- 1617

LCM

Q. Find LCM of 84 and 125

Soln:-

- As they are co-prime numbers the product is the LCM because HCF =1 (for co-primes)
- HCF x LCM = product
- 1   x LCM = 84 x 125
- LCM = 10500

LCM

Q. Find the least number which when divided by 12,15,24 leaves a remainder of 5 in each case

- **Soln:**
- Find LCM(12,15,24) = ?
- LCM = 120
- In an LCM problem, if remainder is common then,

  Result = LCM + common remainder

  = 120+5 = 125

LCM

Q. Find the smallest number which when divided by 20,36,45 leaves a remainder 15,31 and 40 respectively.

- **Soln**:
- Find LCM(20,36,45)
- In LCM problem , if difference is common(constant) then,
- **Result = LCM – Common difference**

- 20 36 45
- 15 31 40

5

- Result = 180 -5

  = 175

LCM

Q. Four numbers are in the ratio of 10: 12 : 15 : 18. If their HCF is 3, then find their LCM.

A. 420 B. 540 C. 620 D. 680

Ans : B

LCM

Q. Find the least number which when divided by 5,6,7 and 8 leaves a reminder of 3 but when divided by 9 leaves no remainder.

A. 1677 B. 2523 C. 3363 D. 1683

Ans: D

LCM(Assignment)

Q. Find the least number which when divided by 12,15,40 leaves a remainder of 5 in each case

A. 120 B. 125 C. 130 D. 140

Ans : B

LCM(Assignment)

Q. If the product of two numbers is 324 and their HCF is 3, then their LCM will be = ?

A. 972 B. 327 C. 321 D. 108

Ans: D

LCM(Assignment)

Q. Three number are in the ratio of 3 : 4 : 5 and their L.C.M. is 2400. Their H.C.F. is:

A. 40 B. 80 C. 120 D. 200

Ans: A

LCM(Assignment)

Q. Find the least number which when divided by 16,18,20 and 25 leaves a reminder of 4 but when divided by 7 leaves no remainder.

A. 17004 B. 18000 C. 18002 D. 18004

Ans: D

Rules to Remember

- **Fractions :**

LCM = LCM of Numerators / HCF of Denominators

HCF = HCF of Numerators / LCM of Denominators

LCM of 25/12 & 35/18

LCM = 175/6

HCF of 25/12 & 35/18

HCF = 5/36

HCF & LCM Fractions(Assignment)

- Find HCF & LCM of 5/9 and 25/36
- Ans : HCF = 5/36 and LCM = 25/9

Rules to Remember

- **Fractions :**

LCM = LCM of Numerators / HCF of Denominators

HCF = HCF of Numerators / LCM of Denominators

LCM of 25/12 & 35/18

LCM = 175/6

HCF of 25/12 & 35/18

HCF = 5/36

HCF & LCM Fractions(Assignment)

- Find HCF & LCM of 5/9 and 25/36
- Ans : HCF = 5/36 and LCM = 25/9

Properties of Square Numbers

- A square can't end with odd number of zeroes. The number of 0's of perfect square is always even and the non-zero part should also be a perfect square.

- A square can't end with 2, 3, 7 or 8.

1	2	3	4	5
6	7	8	9	0

- Square of odd no. is odd & even no. is even

- Whenever last digit of square is 6, then second last digit is always odd.
- Whenever last digit of square is 5, then second last digit is always 2.
- Whenever last digit of square is 1,4,9, then second last digit is always even.

Squares

Q. A man plants his orchard with 15876 trees & arranges them so that there are as many rows as there are trees in each row. How many rows does the orchard have?

A. 124 B. 134 C. 126 D. 136

- **Soln:-**
- No of trees = No. of rows x no of trees/row
- 15876 = n x n
- n = √15876
- n = √9 x 1764
- = √9 x 9 x 196

  = ?

  = 9 x 14

  =126
- **Ans C**

Squares(Assignment)

Q. Find a positive number x, such that the difference between the square of this number and 21 is the same as the product of 4 times the number?

A. 9 B. 27 C. 7 D. 13

Ans : C

Progression

- **Arithmetic Progression :**
- If quantities increase or decrease by a common difference then they are said to be in AP e.g. 3, 5, 7, 9,11,….
- If a is first term, d is the common difference, l is the last term then
- General form : a, a+d, a+2d, a+3d,…,a+(n-1)d
- n^{th} term Tn = a + (n-1)d , **n = 1, 2, ..**
- Sum of first n terms $Sn = \frac{n}{2}[2a + (n-1)d]$

$$\mathbf{Sn = \frac{n}{2}(a + l)}$$

Progression

- Prove that the sum Sn of n terms of an Arithmetic Progress (A.P.) whose first term ‘a’ and common difference ‘d’ is
- S = n/2[2a + (n - 1)d]
- Or, S = n/2[a + l], where l = last term = a + (n - 1)d
- **Proof:**
- a , a+d , a+2d , a+3d,…….., a(n-2)d ,a(n-1)d, as l = last term
- a , a+d , a+2d , a+3d,…….., l-d ,l
- S = a + a+d + a+2d + a+3d + …….. + l-d + l ----------------------1
- Writing equation 1 in reverse order(sum remains same even if we write in reverse order)
- S = l + l-d + l-2d + l-3d + …….. + a+d + a----------------------2
- Adding equation 1 and 2
- 2S = (a + l) + (a + l) + (a + l) + --------- +(a + l) + (a + l)
- So for n terms,
- 2S = n(a + l)
- S = $\frac{n}{2}$ (a + l)

Progression

Q. The sum of all two digit numbers divisible by 3 is

A. 550 B. 1550 C. 1665 D. 1680

Soln

Two digit numbers divisible by 3 are :

12, 15, 18, 21, ……, 96, 99.

This is an A.P. with a = 12, d = 3, l=99

Let n be the number of terms.

Last term = a + (n-1)d

99 = 12 + (n-1)x3

3n = 90 , n = 30

Sum = n/2 (a + l) = 30/2 x (12+99)

= 1665

Ans: C

Progression

Q. Find the sum of all natural numbers between 10 and 200 which are divisible by 7

A. 2835 B. 2865 C. 2678 D. 2646

Soln:

Two digit numbers divisible by 7 are :

14, 21, 28, 35, ……, , 196.

This is an A.P. with a = 14, d = 7, l=196

Last term = a + (n-1)d

OR

$$n = \frac{\text{LastTerm} - \text{FirstTerm}}{d} + 1$$

196= 14 + (n-1)x7

196-14 = (n-1)x7

n-1 = 26

n=27

Sum = n/2 (a + l)

= 27/2 x (14+196)

= 27 × 210 /2

= 27 × 105

= 2835

Ans: A

Progression(Assignment)

Q. Find the sum of the series 3,8,13,18, …….,93

A. 912 B. 925 C. 998 D. 936

Ans : A

Progression

- **Geometric Progression** :
- If quantities increase or decrease by a constant factor then they are said to be in GP e.g. 4, 8, 16, 32, …..
- If a is first term, r is the common ratio, then
- General form : a, ar, ar^2, ar^3,……, ar^{n-1}
- n^{th} term $T_n = ar^{(n-1)}$
- Sum of first n terms **Sn =** $\dfrac{a(r^n - 1)}{(r - 1)}$

Geometric Progression of n terms :

- To prove that the sum of first n terms of the Geometric Progression whose first term 'a' and common ratio 'r' is given by-
- $S = a + ar + ar^2 + ar^3 + ar^4 + \ldots\ldots\ldots\ldots + ar^{n-1}$ -------------- 1
- Multiply both sides of this equation by r
- $Sr = ar + ar^2 + ar^3 + ar^4 + \ldots\ldots\ldots\ldots + ar^{n-1} + ar^n$ -------------- 2

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- Eq 2 - Eq 1
- $Sr - S = ar^n - a$
- $S(r - 1) = a(r^n - 1)$
- $S = \dfrac{a(r^n - 1)}{(r - 1)}$

Geometric Progression

Q. Find the 10th term of the series: 4,16, 64, 256, 1024, ….

A. 4^{10} B. 4^{8} C. 4^{9} D. 1022480

Soln:

The given series is in geometric progression

Where a = 4, r = 4

So $T10 = a \times r^{(10-1)}$

$= 4 \times 4^{(10-1)}$

$= 4^{10}$

Ans: A

Progression

- What is the difference between arithmetic progression and geometric progression?
- A sequence is a set of numbers, called terms, arranged in some particular order. An arithmetic sequence is a sequence with the difference between two consecutive terms constant. The difference is called the common difference. A geometric sequence is a sequence with the ratio between two consecutive terms constant.

THANK YOU!