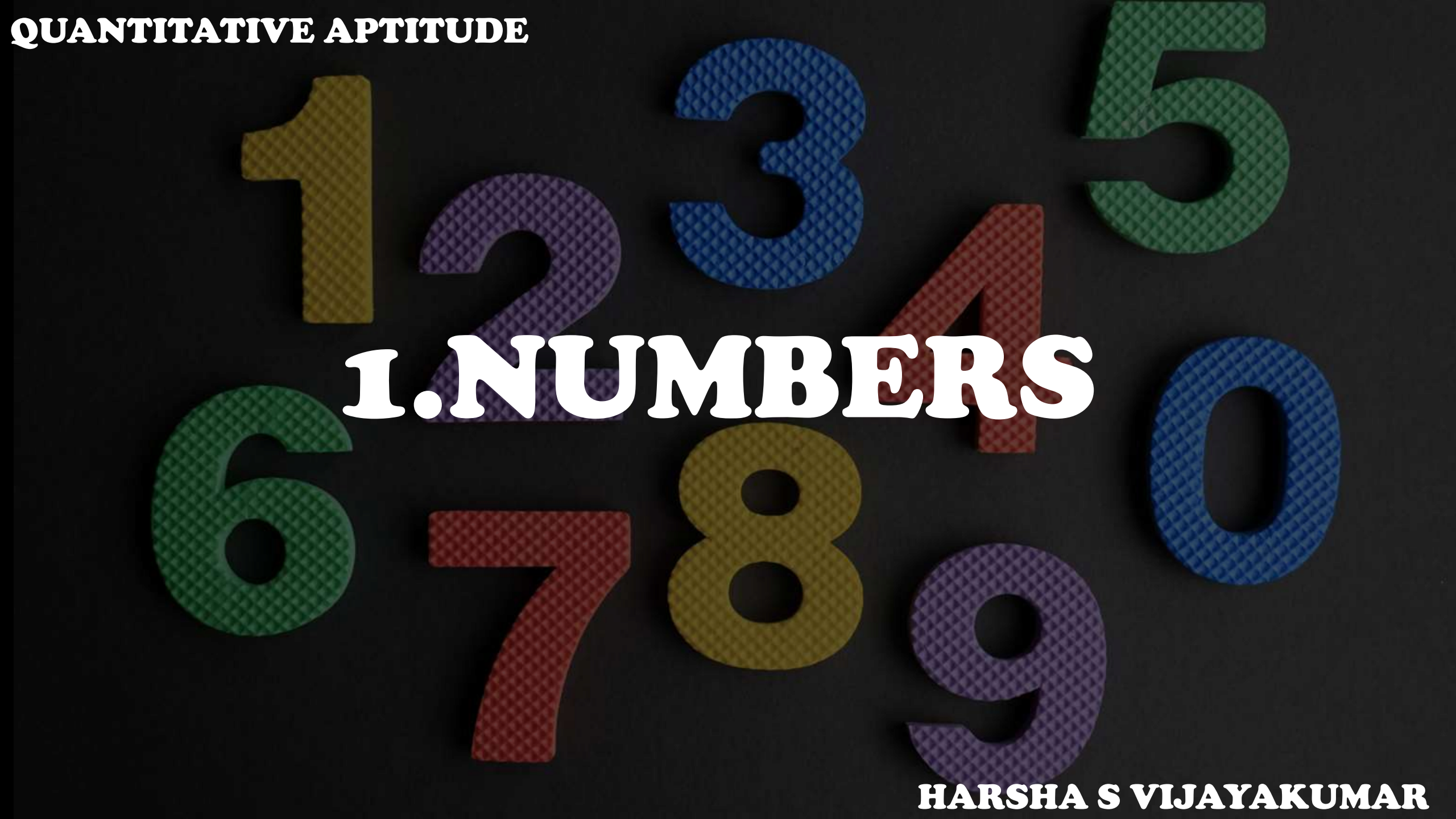
QUANTITATIVE APTITUDE



1.NUMBERS

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NUMBER SYSTEMS

- **Natural numbers:** The counting numbers which are used for counting are known as natural numbers, i.e. 1,2,3,4,5…

- **Whole numbers:** On including '0' in the natural numbers we get the whole numbers, i.e. 0,1,2,3,4,5,6,7,8…

- **Integers:** The whole numbers including the negative numbers and excluding fractions are known as integers, e.g. -5,-4,-3,-2,-1,0,1,2,3,4,5. So, integers can be positive(1,2,3,4,5), negative(-5,-4,-3,-2,-1) or zero(0)

- **Prime numbers:** A whole number having exactly 2 factors including 1 & itself . e.g. 2,3,5,7,11.

NUMBER SYSTEMS

- **Co-prime numbers:** Two natural numbers p and q are said to be co-prime if their H.C.F. is 1, e.g. (2, 3) (4, 5) (7, 9) (11, 9)

- **Composite number:** It refers to a whole number which is greater than 1 and is not a prime number. It can be divided by numbers other than 1 and itself e.g. 4,6,8,9,10,12.

- **Even number:** An integer which is divisible by 2 is known as an even number e.g. 2,4,6,8...

- **Odd number:** An integer which is not divisible by 2 is known as an odd number e.g. 1,3,5,7,9...

NUMBER SYSTEMS

- **Rational number:** The numbers in the form of p/q where p and q are integers and q can't be zero are known as rational numbers, e.g., 22/7, 5/3, 0/11, -143/15.

- **Irrational numbers:** The numbers which when written in decimal form do not terminate and repeat are known as irrational numbers. These numbers cannot be expressed as a ratio of integers or as a fraction, e.g.$\sqrt{2}$,$\sqrt{3}$,$\sqrt{5}$, π, etc.

Some Important Formulae:

i. $(a+b)^2 = a^2 + b^2 + 2ab$

ii. $(a - b)^2 = a^2 + b^2 - 2ab$

iii. $(a+b)^2 - (a - b)^2 = 4ab$

iv. $(a+b)^2 + (a - b)^2 = 2\ (a^2 + b^2\ )$

v. $(a^2 - b^2) = (a - b)\ (a+b)$

vi. $(a^3+b^3) = (a+b)\ (a^2 - ab + b^2)$

vii. $a^3 - b^3 = (a - b)\ (a^2 + ab + b^2)$

viii. $a.(\ b + c) = ab + ac$

ix. $a.(\ b - c) = ab - ac$

x. $(a+b)^3 = a^3 + b^3 + 3ab\ (a+b)$

xi. $(a - b)^3 = a^3 - b^3 - 3ab\ (a - b)$

DIVISIBILITY RULES

Divisible by 2	A number that is even or a number whose last digit is an even number, i.e., 0, 2, 4, 6, and 8.
Divisible by 3	The sum of all the digits of the number should be divisible by 3.
Divisible by 4	The number formed by the last two digits of the number should be divisible by 4 or should be 00.
Divisible by 5	Numbers having 0 or 5 as their one's place digit.
Divisible by 6	A number that is divisible by both 2 and 3.
Divisible by 7	Subtracting twice the last digit of the number from the remaining digits gives a multiple of 7.
Divisible by 8	The number formed by the last three digits of the number should be divisible by 8 or should be 000.
Divisible by 9	The sum of all the digits of the number should be divisible by 9.
Divisible by 10	Any number whose ones place digit is 0.
Divisible by 11	The difference of the sums of the alternative digits of a number is divisible by 11.
Divisible by 12	A number that is divisible by both 3 and 4.

1) Convert the following decimals to fractions

a)0.777....

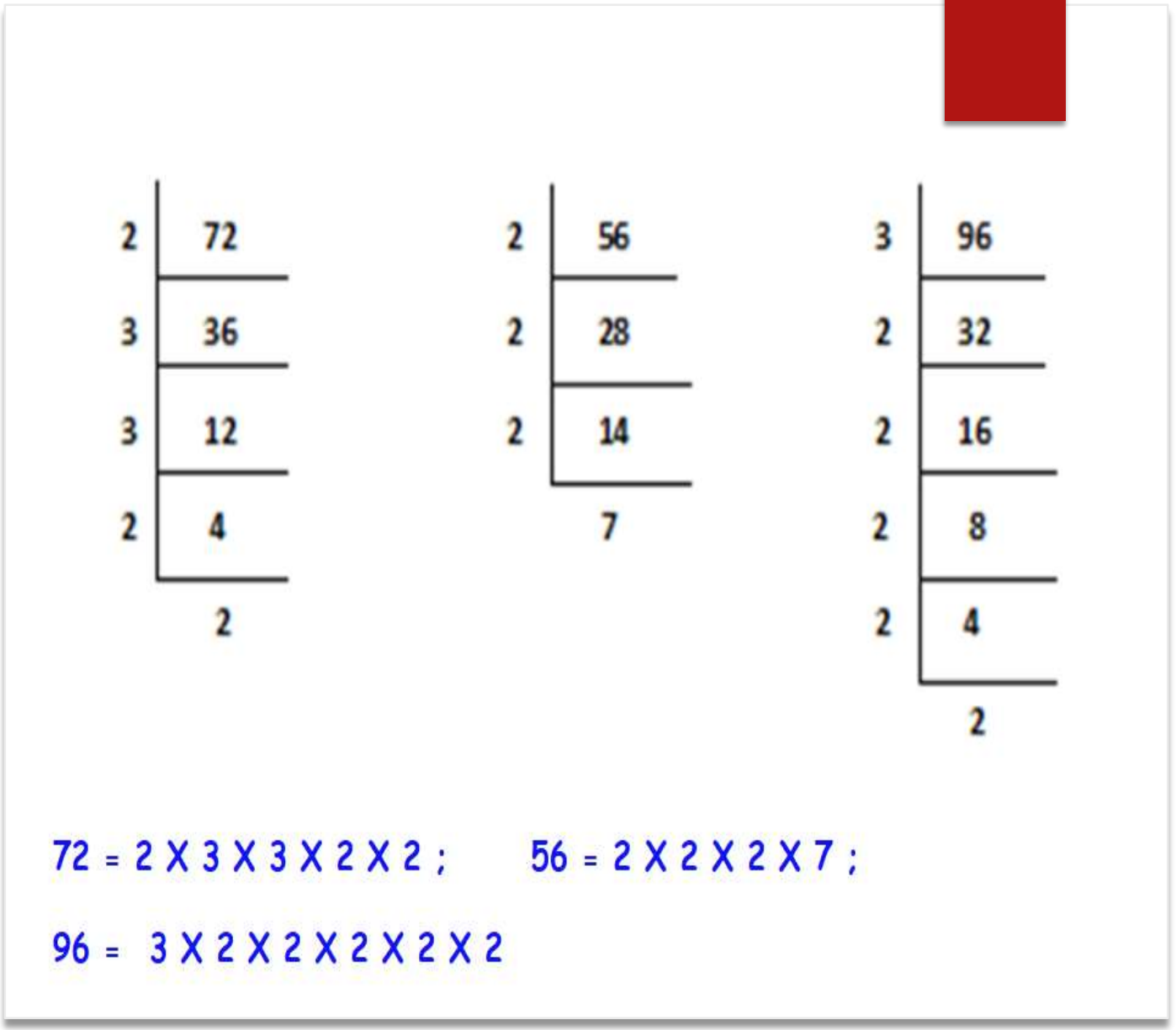
b)0.233333....

b)0.23232323.....

c)0.324242424.....

PRIME FACTORIZATION

- Factorization using prime numbers
- Eg: 2,3,5,7,11,13….



$N = X^a \times Y^b \times Z^c$

where X, Y and Z are the prime numbers and a, b and c are their respective powers.

Number of Factors

The formula for the total number of factors for a given number is given by;

- **Total Number of Factors for N = (a+1) (b+1) (c+1)**

Sum of Factors

The formula for the sum of all factors is given by;

- **Sum of factors of $N = [(X^{a+1}-1)/X-1] \times [(Y^{b+1}-1)/Y-1] \times [(Z^{c+1}-1)/Z-1]$**

Product of Factors

The formula for the product of all factors is given by;

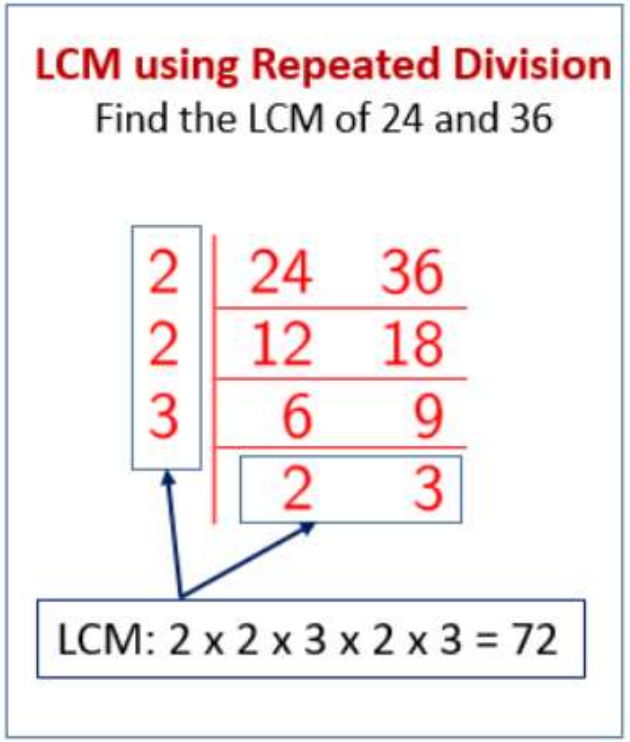
- **Product of factors of $N = N^{\text{Total No. of Factors}/2}$**

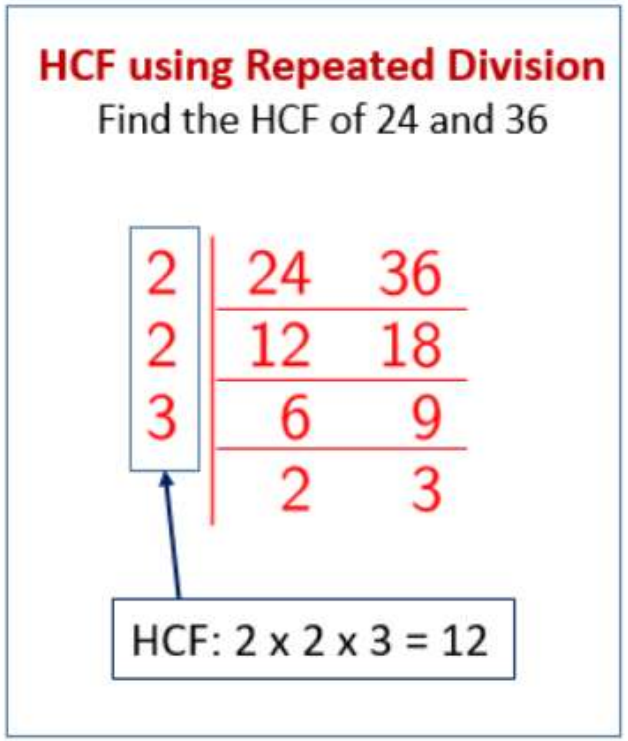
Total Sum & Product of factors of a Number

Total no of Factors of a Number

$N = 2700$		$N = 2^2 \times 3^3 \times 5^2$
Total number of factors	Number of odd factors	Number of even factors
$(a+1) \times (b+1) \times (c+1)$	$(b+1) \times (c+1)$	$Total\ factors - Even\ factors$
$(2+1) \times (3+1) \times (2+1)$ $3 \times 4 \times 3 = 36$	$(3+1) \times (2+1)$ $4 \times 3 = 12$	$36 - 12$ 24

LCM & HCF


LCM using Repeated Division
Find the LCM of 24 and 36
2 | 24 36
2 | 12 18
3 | 6 9
2 3
LCM: 2 x 2 x 3 x 2 x 3 = 72


HCF using Repeated Division
Find the HCF of 24 and 36
2 | 24 36
2 | 12 18
3 | 6 9
2 3
HCF: 2 x 2 x 3 = 12

1) Find the LCM&HCF of the following

a)36,90,48

b)24,36,144

b)5/7,10/9,15/14

c)2/3,4/9,8/15

2)The product of 2 numbers is 18750 and their LCM is 750 then, find the HCF of the numbers

- A)25
- B)50
- C)75
- D)100

3)What is the least number which when divided by **12, 15, and 18** leaves a remainder **7** in each case?

- **A)187**
- **B)207**
- **C)197**
- **D)157**

4)Find the least number which when divided by 8, 12, 20 and 36 leaves remainders 6, 10, 18 and 34 respectively.

- **A)366**
- **B)370**
- **C)358**
- **D)378**

5)The greatest number of four digits which is divisible by 15, 25, 40 and 75 is:

- A)9000
- B)9600
- C)9400
- D)9800

6)Find the greatest number which when divides 259 and 465 leaves remainders 4 and 6 respectively.

- A)51
- B)37
- C)93
- D)95

7)Let N be the greatest number that will divide 1305, 4665 and 6905, leaving the same remainder in each case. Then sum of the digits in N is:

- A)4
- B)5
- C)6
- D)8

REMAINDER THEORAM

- **Rules pertaining to x^n–y^n**
- (i)It is always divisible by x –y (i.e., x –y is always a factor of xn–yn).
- (ii)It is also divisible by x + y when n is even.
- (iii)It is not divisible by x + y when n is odd.

- **Rules pertaining to x^n+ y^n**
- (i)It is never divisible by x -y (i.e., x –y is never a factor of x^n+ y^n).
- (ii)It is divisible by x + y whenever n is odd.
- (iii)It is not divisible by x + y when n is even.

1)Find the remainder when 47 x 52 is divided by 6

- A)1
- B)2
- C)3
- D)4

2)Find the remainder when $(321)^{5687}$ is divided by 8

- A)1
- B)5
- C)3
- D)4

3)Find the remainder when $(146)^{56}$ is divided by 7

- A)1
- B)6
- C)3
- D)4

4)Find the remainder when $(269)^{56587}$ is divided by 6

- A)1
- B)5
- C)3
- D)4

LAST DIGIT

Number	Cyclicity	Power Cycle
1	1	1
2	4	2, 4, 8, 6
3	4	3, 9, 7, 1
4	2	4, 6
5	1	5
6	1	6
7	4	7, 9, 3, 1
8	4	8, 4, 2, 6
9	2	9, 1
10	1	0

1)What is the last digit of $(269)^{56587}$

- A)1
- B)9
- C)3
- D)4

2)What is the last digit of $(322)^{5687}$

- A)2
- B)4
- C)6
- D)8