BASIC MATHS

Formula Sheet

For students preparing for MAH-B.BCA/BBA/BMS/BBM CET 2024 for admission to BCA, BBA, BMS, BBM

Important Note for Even and Odd Number

1. EVEN +/- EVEN = EVEN
2. ODD +/- ODD = EVEN
3. EVEN +/- ODD = ODD
4. EVEN x EVEN = EVEN
5. ODD x ODD = ODD
6. EVEN x ODD = EVEN

Most Important Algebraic Formulae's

1. $(a + b)^2 = a^2 + 2ab + b^2$
2. $(a - b)^2 = a^2 - 2ab + b^2$
3. $a^2 - b^2 = (a + b)(a - b)$
4. $(x + a)(x + b) = x^2 + (a + b)x + ab$
5. $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \qquad = a^3 + b^3 + 3ab(a + b)$
6. $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \qquad = a^3 - b^3 - 3ab(a - b)$
7. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
8. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
9. $(a + b + c)^3 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$
10. $\frac{a^3 + b^3 + c^3 - 3abc}{a^2 + b^2 + c^2 - ab - bc - ac} = a + b + c$

Areas and Perimeter:

1. Area of triangle $= \frac{1}{2} \times base \times height$

2. Perimeter of triangle = sum of all sides

3. Heron's Formula for area of a triangle when all 3 sides are known as a, b, c:

   $s = \frac{a+b+c}{2}$

   $Area = \sqrt{s(s-a)(s-b)(s-c)}$

4. Area of square = (side)^2

5. Perimeter of square = 4(side)

6. Area of rhombus = ½ x (d$_1$ x d$_2$)   [d$_1$ & d$_2$ are the length of the diagonals]

7. Perimeter of rhombus = 4 x side

8. Area of rectangle = l x b

9. Perimeter of rectangle = 2 (l+b)

10. Area of parallelogram = length x height

11. Perimeter of parallelogram = 2 (a+b)

    [where a and b are the length of the equal sides of the parallelogram]

12. Area of trapezium $= \frac{1}{2} \times height \times (a+b)$

    [where a and b are the length of the parallel sides]

13. Area of circle $= \pi r^2$

14. Perimeter of circle = Circumference $= 2\pi r$

15. Pythagoras Theorem: Hypotenuse^2 = (One side)^2 + (Other Side)^2

Laws of Indices / exponents:

1. $a^m \times a^n = a^{m+n}$

2. $\dfrac{a^m}{a^n} = a^{m-n}$

3. $(a^m)^n = a^{m \times n}$

4. $a^m \times b^m = (ab)^m$

5. $\dfrac{a^m}{b^m} = \left(\dfrac{a}{b}\right)^m$

6. $a^0 = 1$

7. $\sqrt[n]{a} = a^{\frac{1}{n}}$

8. $(-a)^m = a^m$ ➔ If m is EVEN number

9. $(-a)^m = -a^m$ ➔ If m is ODD number

LCM

How to find?

USING PRIME FACTORISATION

    i.   Do factorization and represent repeated factors with powers.

    ii.   For common factor base,

        Choose the number with HIGHEST power.

    iii.   Get the product of the number obtained in step (ii) and other unique factors.

Example: LCM of 10, 24

$10 = 2 \times 5$

$24 = 2^3 \times 3$

$LCM = 2^3 \times 3 \times 5 = 120$

NOTE:

1. LCM of number and its factor is number itself.
2. LCM of relative prime number is the product of both.

HCF

How to find?

USING PRIME FACTORISATION

    i.   Do factorization and represent repeated factors with powers.

    ii.   For common factor base,

        Choose the number with LEAST power.

Example: HCF of 4 and 6

$4 = 2^2$

$6 = 2 \times 3$

$HCF = 2$

Relation between LCM & HCF:

For numbers a and b,

[LCM of a, b] x (HCF of a, b) = a x b