



BODMAS RULE



1. Full Form of BODMAS

B	Brackets	(), { }, []
O	Orders	Powers / Roots (a^2 , $\sqrt{a}$ etc.)
D	Division	$\div$
M	Multiplication	$\times$
A	Addition	$+$
S	Subtraction	$-$

2. Priority Order (Highest to Lowest)

①	Brackets	Solve inside brackets first.
②	Orders	Evaluate powers and roots.
③	Division	From left to right.
④	Multiplication	From left to right.
⑤	Addition	From left to right.
⑥	Subtraction	From left to right.

3. Solved Examples

Example 1:

$$15 + 8 \times 2 - 6 \div 3$$

$$\text{Step 1: } 8 \times 2 = 16 \text{ and } 6 \div 3 = 2$$

$$= 15 + 16 - 2$$

$$\text{Step 2: } 15 + 16 = 31$$

$$= 31 - 2$$

$$\text{Step 3} = \boxed{29}$$

Example 2:

$$(18 - 4) \times 5 + 12 \div 3$$

$$\text{Step 1: } (18 - 4) = 14 \text{ and } 12 \div 3 = 4$$

$$= 14 \times 5 + 4$$

$$\text{Step 2: } 14 \times 5 = 70$$

$$= 70 + 4$$

$$\text{Step 3} = \boxed{74}$$

Example 3:

$$2^3 + 4 \times (6 - 2)^2$$

$$\text{Step 1: } 2^3 + 4 \times (4)^2$$

$$= 8 + 4 \times 16$$

$$\text{Step 2: } 4 \times 16 = 64$$

$$= 8 + 64$$

$$\text{Step 3} = \boxed{72}$$

4. Common Mistakes

1. Ignoring Brackets

Wrong:

$$2 + (3 \times 4) = (2 + 3) \times 4 = 20 \times$$

Right:

$$2 + (3 \times 4) = 2 + 12 = 14 \checkmark$$

2. Doing Multiplication before Division

Wrong:

$$12 \div 3 \times 2 = 12 \div (3 \times 2) = 2 \times$$

Right:

$$12 \div 3 \times 2 = 4 \times 2 = 8 \checkmark$$

3. Not following Left to Right

Wrong:

$$10 - 6 + 2 = 10 - (6 + 2) = 2 \times$$

Right:

$$10 - 6 + 2 = 4 + 2 = 6 \checkmark$$

4. Forgetting Powers / Roots

Wrong:

$$\sqrt{16} + 3^2 = (\sqrt{16} + 3)^2 = 25 \times$$

Right:

$$\sqrt{16} + 3^2 = 4 + 9 = 13 \checkmark$$

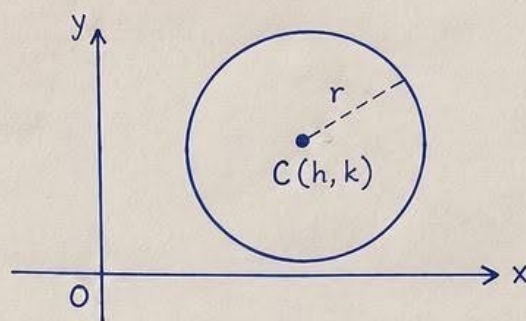
Remember:

First B, then O, then D, then M, then A, then S.
Follow the order and solve with confidence.

* CONIC SECTIONS *

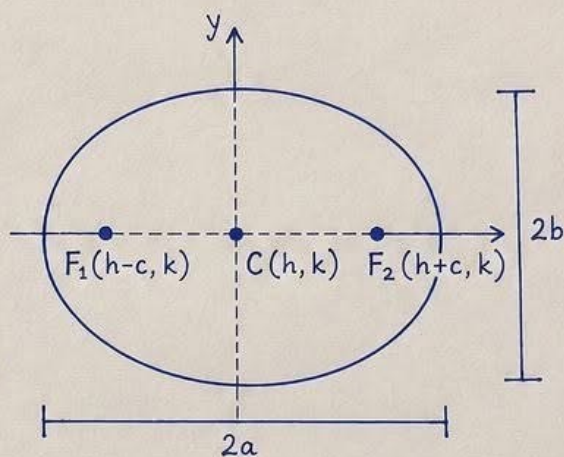
1) CIRCLE

- Standard Equation : $(x-h)^2 + (y-k)^2 = r^2$
- Centre : (h, k)
- Radius : r
- Eccentricity (e) : 0 (Always)
- Shape : Closed curve



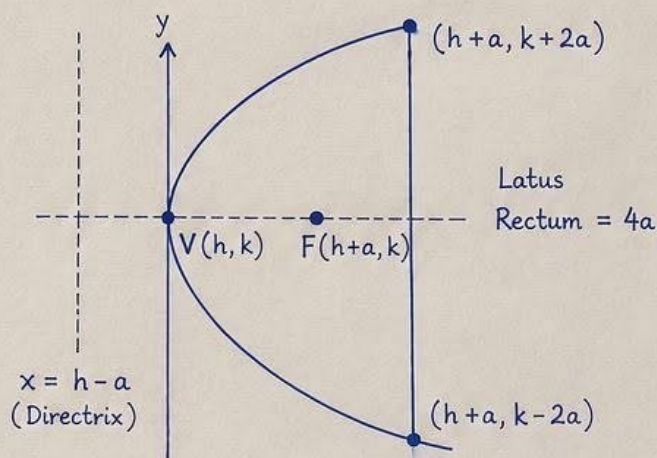
2) ELLIPSE

- Standard Equation : $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$
($a > b > 0$, Major axis along x-axis)
- Centre : (h, k)
- Foci : $(h \pm c, k)$, where $c^2 = a^2 - b^2$
- Major Axis Length : $2a$ (along x-axis)
- Minor Axis Length : $2b$ (along y-axis)
- Eccentricity (e) : $e = \frac{c}{a} = \sqrt{1 - \frac{b^2}{a^2}}$, $0 < e < 1$
- Shape : Closed curve



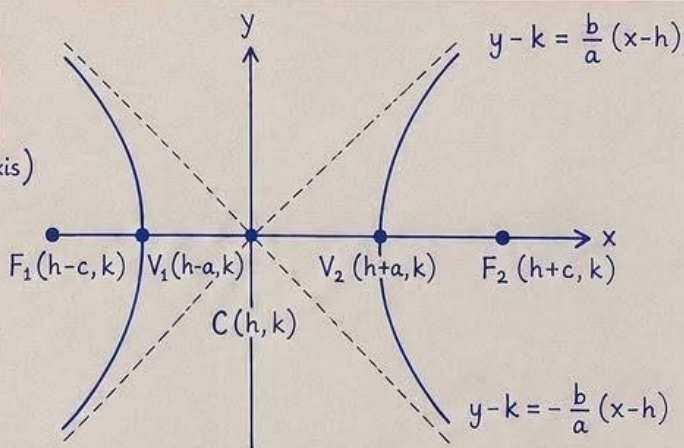
3) PARABOLA

- Standard Equation ($a > 0$): $y^2 = 4ax$ (Opens right)
- Vertex : (h, k)
- Focus : $(h + a, k)$
- Directrix : $x = h - a$
- Axis of Symmetry : $y = k$
- Latus Rectum Length : $4a$
- Eccentricity (e) : 1
- Shape : Open curve
- Note : Other orientations are obtained by changing signs or interchanging x and y .



4) HYPERBOLA

- Standard Equation : $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
($a > 0, b > 0$, Transverse axis along x-axis)
- Centre : (h, k)
- Foci : $(h \pm c, k)$, where $c^2 = a^2 + b^2$
- Vertices : $(h-a, k)$, $(h+a, k)$
- Asymptotes : $y - k = \pm \frac{b}{a}(x - h)$
- Eccentricity (e) : $e = \frac{c}{a} = \sqrt{1 + \frac{b^2}{a^2}}$, $e > 1$
- Shape : Open curve

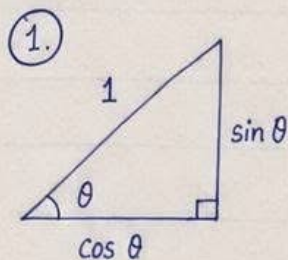


★ NOTE :

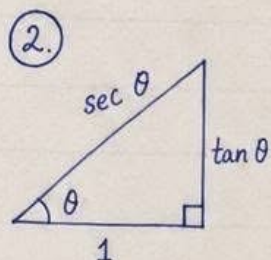
- For ellipse, if major axis is along y-axis, interchange a and b .
- For hyperbola, if transverse axis is along y-axis, the equation is

$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$

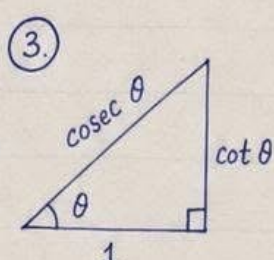
20 Essential Trigonometry Formulas



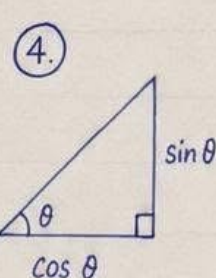
$$\sin^2 \theta + \cos^2 \theta = 1$$



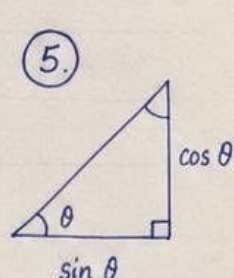
$$1 + \tan^2 \theta = \sec^2 \theta$$



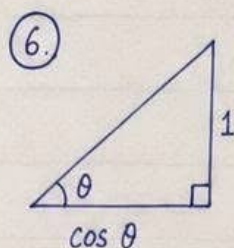
$$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$



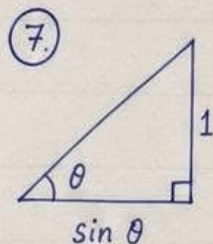
$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$



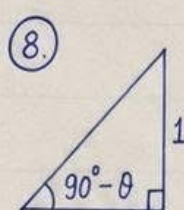
$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$



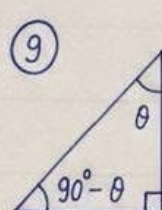
$$\sec \theta = \frac{1}{\cos \theta}$$



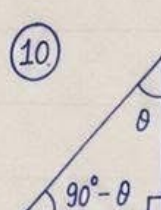
$$\operatorname{cosec} \theta = \frac{1}{\sin \theta}$$



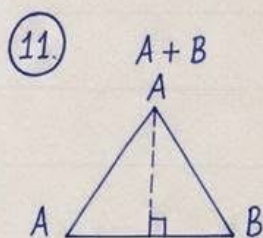
$$\sin(90^\circ - \theta) = \cos \theta$$



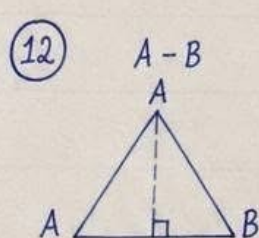
$$\cos(90^\circ - \theta) = \sin \theta$$



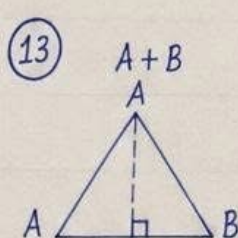
$$\tan(90^\circ - \theta) = \cot \theta$$



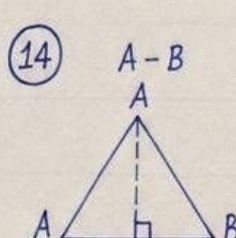
$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$



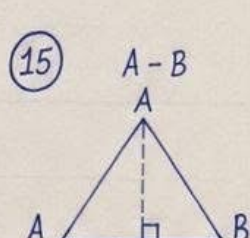
$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$



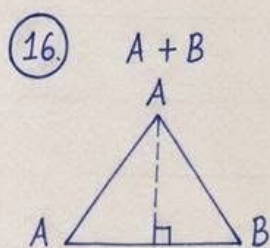
$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$



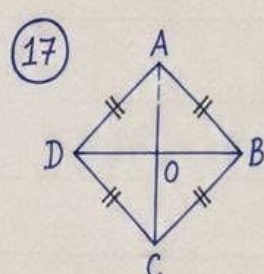
$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$



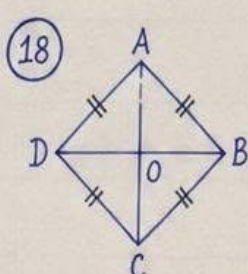
$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$



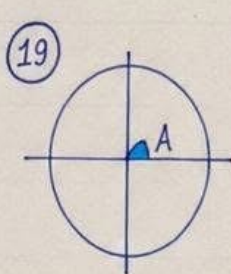
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$



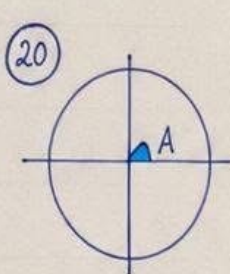
$$2 \sin A \cos B = \sin(A+B) + \sin(A-B)$$



$$2 \cos A \sin B = \sin(A+B) - \sin(A-B)$$



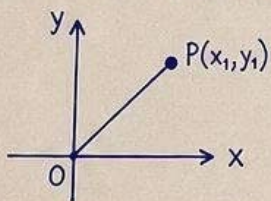
$$\sin 2A = 2 \sin A \cos A$$



$$\cos 2A = \cos^2 A - \sin^2 A$$

GEOMETRY FORMULAS AND THEOREMS

① DISTANCE FORMULA



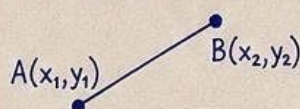
$$OP = \sqrt{x^2 + y^2}$$

② SECTION FORMULA (INTERNAL)



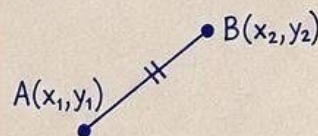
$$P\left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n}\right)$$

③ SECTION FORMULA (EXTERNAL)



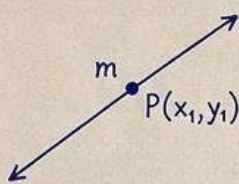
$$P\left(\frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n}\right)$$

④ MIDPOINT FORMULA



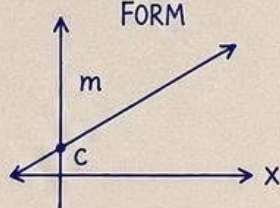
$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

⑤ SLOPE OF A LINE



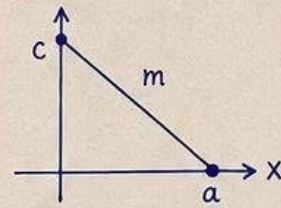
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

⑥ SLOPE-INTERCEPT FORM



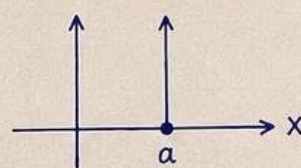
$$y = mx + c$$

⑦ INTERCEPT FORM



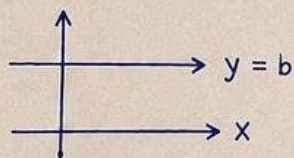
$$\frac{x}{a} + \frac{y}{b} = 1$$

⑧ EQUATION OF VERTICAL LINE



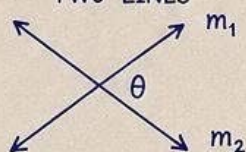
$$x = a$$

⑨ EQUATION OF HORIZONTAL LINE



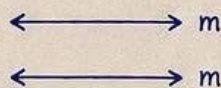
$$y = b$$

⑩ ANGLE BETWEEN TWO LINES



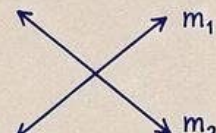
$$\tan \theta = \frac{m_2 - m_1}{1 + m_1 m_2}$$

⑪ CONDITION FOR PARALLEL LINES



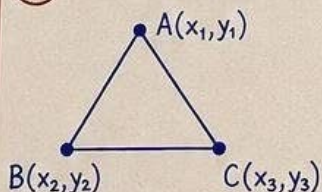
$$m_1 = m_2$$

⑫ CONDITION FOR PERPENDICULAR LINES



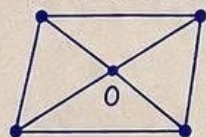
$$m_1 m_2 = -1$$

⑬ AREA OF TRIANGLE



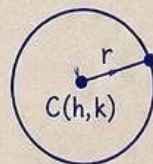
$$\Delta = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$$

⑭ DIAGONALS OF A // GRAM BISECT



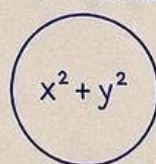
If ABCD is a parallelogram then AC and BD bisect each other.

⑮ EQUATION OF CIRCLE



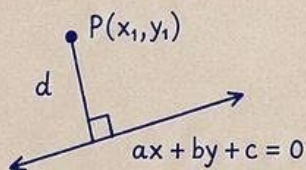
$$(x - h)^2 + (y - k)^2 = r^2$$

⑯ GENERAL EQUATION OF CIRCLE



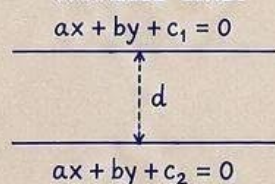
$$x^2 + y^2 + 2gx + 2fy + c = 0$$

⑰ DISTANCE OF POINT FROM A LINE



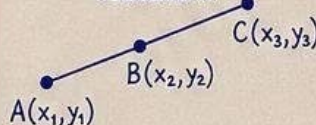
$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

⑱ DISTANCE BETWEEN PARALLEL LINES



$$d = \frac{|c_1 - c_2|}{\sqrt{a^2 + b^2}}$$

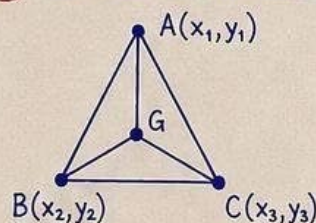
⑲ POINTS ARE COLLINEAR



$$\text{Area of } \Delta ABC = 0$$

$$\frac{y_2 - y_1}{y_3 - y_2} = \frac{x_2 - x_1}{x_3 - x_2}$$

⑳ CENTROID OF TRIANGLE



$$G\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

AVERAGE FORMULA SHEET

① BASIC AVERAGE: ✓

$$\text{Average} = \frac{\text{Sum of values}}{\text{Number of values}}$$

② SUM FORMULA: ✓

$$\text{Sum} = \text{Average} \times \text{Number}$$

③ COMBINED AVERAGE: ✓

$$\text{Average} = \frac{n_1 A_1 + n_2 A_2}{n_1 + n_2}$$

④ NEW AVERAGE (ADDING VALUE): ✓

$$\text{New Average} = \frac{\text{Old Sum} + \text{New Value}}{n + 1}$$

⑤ NEW AVERAGE (REMOVING VALUE): ✓

$$\text{New Average} = \frac{\text{Old Sum} - \text{Removed Value}}{n - 1}$$

⑥ AVERAGE OF CONSECUTIVE NUMBERS: ✓

$$\text{Average} = \text{middle number}$$

⑦ AVERAGE SPEED: ✓

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

⑧ WEIGHTED AVERAGE: ✓

$$\text{Average} = \frac{\sum (x \times w)}{\sum w}$$

⑨ FIRST n NATURAL NUMBERS: ✓

$$\text{Average} = \frac{n + 1}{2}$$

⑩ SHORTCUT IDEA: ✓

$$\text{Average} \times n = \text{Total}$$

≡ ALGEBRA ≡

REFERENCE SHEETS

1. BASIC IDENTITIES

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

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

$$(a+b)(a-b) = a^2 - b^2$$

$$(x+a)(x+b) = x^2 + (a+b)x + ab$$

$$(x-a)(x-b) = x^2 - (a+b)x + ab$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab+bc+ca)$$

2. FACTORISATION

$$(i) \quad a^2 - b^2 = (a+b)(a-b)$$

$$(ii) \quad a^2 + 2ab + b^2 = (a+b)^2$$

$$(iii) \quad a^2 - 2ab + b^2 = (a-b)^2$$

$$(iv) \quad a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$(v) \quad a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$(vi) \quad x^2 + (a+b)x + ab = (x+a)(x+b)$$

3. SPECIAL PRODUCTS

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

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

$$a^3 + b^3 + c^3 - 3abc =$$

$$(a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

4. LAWS OF EXPONENTS

$$(1) \quad a^m \times a^n = a^{m+n}$$

$$(2) \quad a^m \div a^n = a^{m-n} \quad (a \neq 0)$$

$$(3) \quad (a^m)^n = a^{mn}$$

$$(4) \quad (ab)^n = a^n b^n$$

$$(5) \quad \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \quad (b \neq 0)$$

$$(6) \quad a^0 = 1 \quad (a \neq 0)$$

$$(7) \quad a^{-n} = \frac{1}{a^n}$$

5. FRACTIONS (ALGEBRAIC)

$$(a) \quad \frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$$

$$(b) \quad \frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$$

$$(c) \quad \frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

$$(d) \quad \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc} \quad (b \neq 0, d \neq 0, c \neq 0)$$

6. QUADRATIC EQUATIONS

Standard form: $ax^2 + bx + c = 0$ ($a \neq 0$)

Roots (using formula):

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{Sum of roots} = \frac{-b}{a}$$

$$\text{Product of roots} = \frac{c}{a}$$

7. LINEAR EQUATIONS

$$ax + b = 0 \quad (a \neq 0)$$

$$x = \frac{-b}{a}$$

$$ax + by + c = 0$$

(in two variables)

8. INEQUALITIES

If $a > b$, then $a + c > b + c$

If $a > b$, then $a - c > b - c$

If $a > b$ and $c > 0$, then $ac > bc$

If $a > b$ and $c < 0$, then $ac < bc$

If $a > b$, then $\frac{1}{a} < \frac{1}{b}$ ($a, b > 0$)

9. SIMULTANEOUS EQUATIONS

For two equations:

$$a_1x + b_1y + c_1 = 0$$

$$a_2x + b_2y + c_2 = 0$$

Solution by:

- * Substitution Method
- * Elimination Method
- * Cross Multiplication Method

10. COMMON FORMULAS

$$\bullet \text{ Area of Square} = a^2$$



$$\bullet \text{ Area of Rectangle} = l \times b$$



$$\bullet \text{ Area of Triangle} = \frac{1}{2}bh$$



$$\bullet \text{ Area of Circle} = \pi r^2$$



$$\bullet \text{ Circumference of Circle} = 2\pi r$$

11. POLYNOMIALS

• Degree of polynomial = Highest power of the variable

• Zero of $p(x)$: If $p(a) = 0$, then $(x-a)$ is a factor.

• Remainder Theorem: If $p(x)$ is divided by $(x-a)$, remainder = $p(a)$.

• Factor Theorem: If $p(a) = 0$, then $(x-a)$ is a factor of $p(x)$.

12. BINOMIAL THEOREM

$$(a+b)^n = \sum_{r=0}^n {}^nC_r a^{n-r} b^r$$

$$\text{Where, } {}^nC_r = \frac{n!}{r!(n-r)!}$$

First 4 Terms:

$$T_1 = {}^nC_0 a^n$$

$$T_2 = {}^nC_1 a^{n-1} b$$

$$T_3 = {}^nC_2 a^{n-2} b^2$$

$$T_4 = {}^nC_3 a^{n-3} b^3$$

QUICK TIPS

* Memorize identities and formulas.

* Practice regularly to gain speed.

* Simplify before calculating.

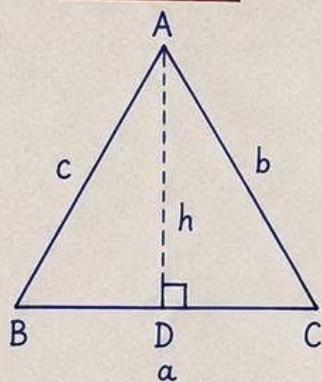
* Check your answer.

Practice More
Score More



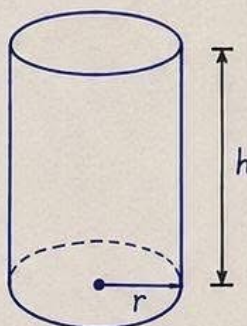
GEOMETRY FORMULAS

1. TRIANGLE



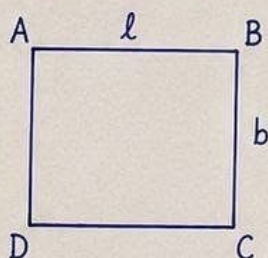
- Area = $\frac{1}{2}bh$
(h = altitude to base b)
- Perimeter = $a + b + c$
- Semi-perimeter
$$s = \frac{a + b + c}{2}$$
- Area (Heron's Formula)
$$= \sqrt{s(s-a)(s-b)(s-c)}$$

6. CYLINDER



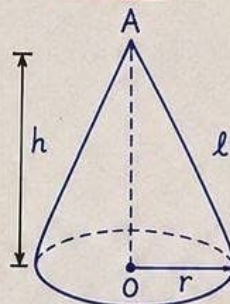
- Volume (V) = $\pi r^2 h$
- Curved Surface Area (CSA)
 $= 2\pi r h$
- Total Surface Area (TSA)
 $= 2\pi r(r + h)$

2. RECTANGLE



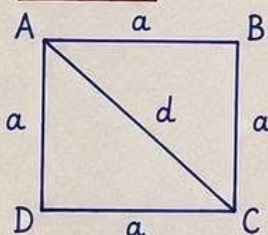
- Area = $l \times b$
- Perimeter = $2(l + b)$
- Diagonal = $\sqrt{l^2 + b^2}$

7. CONE



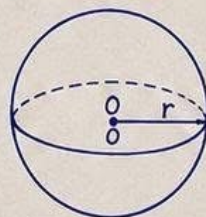
- Volume (V) = $\frac{1}{3}\pi r^2 h$
- Slant height (l) = $\sqrt{r^2 + h^2}$
- Curved Surface Area (CSA)
 $= \pi r l$
- Total Surface Area (TSA)
 $= \pi r(l + r)$

3. SQUARE



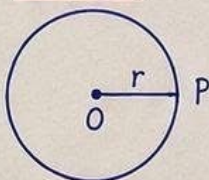
- Area = a^2
- Perimeter = $4a$
- Diagonal = $a\sqrt{2}$

8. SPHERE



- Volume (V) = $\frac{4}{3}\pi r^3$
- Surface Area (SA)
 $= 4\pi r^2$

4. CIRCLE



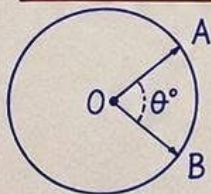
- Area = πr^2
- Circumference = $2\pi r$
- Diameter = $2r$

9. HEMISPHERE



- Volume (V) = $\frac{2}{3}\pi r^3$
- Curved Surface Area (CSA)
 $= 2\pi r^2$
- Total Surface Area (TSA)
 $= 3\pi r^2$

5. SECTOR OF A CIRCLE



- Area of sector = $\frac{\theta}{360^\circ}\pi r^2$
- Arc length = $\frac{\theta}{360^\circ}(2\pi r)$

Note:

- In all formulas, r = radius
- θ is in degrees
- All lengths are in same unit.
- All formulas are valid in Euclidean geometry.

Integer Operations

Addition :

- $(+, +) \rightarrow$ Add numbers $\longrightarrow$ Result is Positive
- $(+, -) \rightarrow$ Subtract numbers $\longrightarrow$ Result is Sign of Larger Number
- $(-, +) \rightarrow$ Subtract numbers $\longrightarrow$ Result is Sign of Larger Number
- $(-, -) \rightarrow$ Add numbers $\longrightarrow$ Result is Negative

Subtraction :

- $(+, +) \rightarrow$ Change sign of second number $\rightarrow$ Then $(+, -) \Rightarrow$ case
 $\rightarrow$ Result is Sign of Larger Number
- $(+, -) \rightarrow$ Change sign of second number $\rightarrow$ Then $(+, +) \Rightarrow$ case
 $\rightarrow$ Result is Positive
- $(-, +) \rightarrow$ Change sign of second number $\rightarrow$ Then $(-, -) \Rightarrow$ case
 $\rightarrow$ Result is Negative
- $(-, -) \rightarrow$ Change sign of second number $\rightarrow$ Then $(-, +) \Rightarrow$ case
 $\rightarrow$ Result is Sign of Larger Number

Multiplication :

- $(+, +) \rightarrow$ Result is Positive
- $(+, -) \rightarrow$ Result is Negative
- $(-, -) \rightarrow$ Result is Positive

Division :

- $(+ \div +) \rightarrow$ Result is Positive
- $(+, -) \rightarrow$ Result is Negative
- $(-, -) \rightarrow$ Result is Positive

Note : Integer operations follow specific rules based on the signs of the numbers. These rules help us find the correct result for addition, subtraction, multiplication and division.

Maths

Important Numbers:

- ① Natural numbers $\rightarrow 1, 2, 3, 4, 5, 6, \dots$
- ② Even numbers $\rightarrow 2, 4, 6, 8, 10, 12, \dots$
- ③ Odd numbers $\rightarrow 1, 3, 5, 7, 9, 11, \dots$
- ④ Whole numbers $\rightarrow 0, 1, 2, 3, 4, 5, \dots$
- ⑤ Integer numbers $\rightarrow \dots, -3, -2, -1, 0, 1, 2, 3, \dots$
- ⑥ Prime numbers $\rightarrow 2, 3, 5, 7, 11, \dots$
- ⑦ Composite numbers $\rightarrow 4, 6, 8, 9, 10, 12, \dots$
- ⑧ Co-prime numbers $\rightarrow (5, 7), (2, 3), (8, 15)$
- ⑨ Rational numbers $\rightarrow 0, \frac{1}{2}, -\frac{3}{1}, 5, -1, \sqrt{4}$
- ⑩ Irrational numbers $\rightarrow \pi, \sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7}$
- ⑪ Real numbers = Rational + Irrational
Examples: $2, -5, 0, \frac{1}{2}, \sqrt{2}, \pi$
- ⑫ Imaginary numbers $\rightarrow \sqrt{-1}, \sqrt{-4}, \sqrt{-9}$
These are not real numbers.

Smallest Numbers:

- Smallest prime number = 2
- Smallest even prime number = 2
- Smallest composite number = 4
- Smallest whole number = 0
- Smallest natural number = 1

Other Important Value:

- π (Pi) $\approx \frac{22}{7}$ or 3.14159

Note: $\rightarrow \sqrt{4}$ is rational because $\sqrt{4} = 2$,
but $\sqrt{2}$ and $\sqrt{3}$ are irrational.



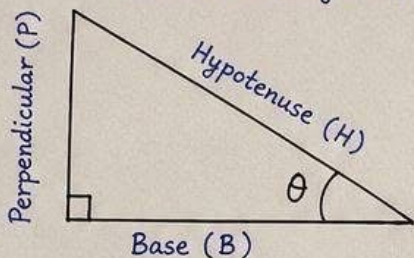
TRIGONOMETRY (त्रिकोणमिति)



ALL FORMULAS - CLASS 10

1. BASIC TRIGONOMETRIC RATIOS

In a right angled triangle, with reference to angle θ ,



$$\sin \theta = \frac{\text{Perpendicular}}{\text{Hypotenuse}} = \frac{P}{H}$$

$$\cos \theta = \frac{\text{Base}}{\text{Hypotenuse}} = \frac{B}{H}$$

$$\tan \theta = \frac{\text{Perpendicular}}{\text{Base}} = \frac{P}{B}$$

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta} = \frac{\text{Hypotenuse}}{\text{Perpendicular}} = \frac{H}{P}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{Hypotenuse}}{\text{Base}} = \frac{H}{B}$$

$$\cot \theta = \frac{1}{\tan \theta} = \frac{\text{Base}}{\text{Perpendicular}} = \frac{B}{P}$$

2. IMPORTANT IDENTITIES

$$\textcircled{1} \sin^2 \theta + \cos^2 \theta = 1$$

$$\textcircled{2} 1 + \tan^2 \theta = \sec^2 \theta$$

$$\textcircled{3} 1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

3. TRIGONOMETRIC RATIOS OF STANDARD ANGLES

θ	0°	30°	45°	60°	90°
$\sin \theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined
$\operatorname{cosec} \theta$	Not defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
$\sec \theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not defined
$\cot \theta$	Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

4. COMPLEMENTARY ANGLES ($90^\circ - \theta$)

- $\sin (90^\circ - \theta) = \cos \theta$
- $\cos (90^\circ - \theta) = \sin \theta$
- $\tan (90^\circ - \theta) = \cot \theta$
- $\cot (90^\circ - \theta) = \tan \theta$
- $\sec (90^\circ - \theta) = \operatorname{cosec} \theta$
- $\operatorname{cosec} (90^\circ - \theta) = \sec \theta$

5. USEFUL RELATIONS

- $\tan \theta = \frac{\sin \theta}{\cos \theta}$
- $\cot \theta = \frac{\cos \theta}{\sin \theta}$

6. HEIGHTS & DISTANCES

- $\tan \theta = \frac{\text{Height}}{\text{Distance}}$
- $\sin \theta = \frac{\text{Height}}{\text{Hypotenuse}}$
- $\cos \theta = \frac{\text{Distance}}{\text{Hypotenuse}}$

7. IMPORTANT VALUES / NOTES

- $\tan 90^\circ = \text{Not defined}$
- $\cot 0^\circ = \text{Not defined}$
- $\sin 90^\circ = 1$, $\cos 0^\circ = 1$
- $\sin 0^\circ = 0$, $\cos 90^\circ = 0$
- $\operatorname{cosec} 0^\circ = \text{Not defined}$
- $\sec 90^\circ = \text{Not defined}$

8. SIGNS OF TRIGONOMETRIC RATIOS

1st Quadrant (0° to 90°)	2nd Quadrant (90° to 180°)
All ratios Positive (+)	Only $\sin$ (+)
3rd Quadrant (180° to 270°)	4th Quadrant (270° to 360°)
Only $\tan$ (+)	Only $\cos$ (+)



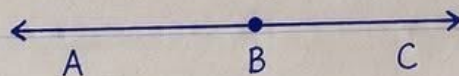
Practice More $\rightarrow$ Score More $\rightarrow$ All The Best !



GEOMETRY OF STRAIGHT LINES

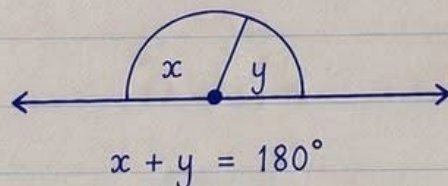
1 WHAT IS A STRAIGHT LINE?

- A straight line is a line that goes on forever in both directions.
- It has no curves.
- It can be drawn with a ruler.



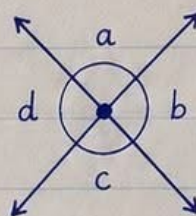
2 ANGLES ON A STRAIGHT LINE

- Angles on a straight line add up to 180° .
- This means they are supplementary.



3 ANGLES AT A POINT

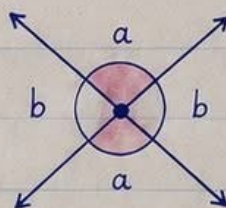
- Angles around a point add up to 360° .
- This means they are complementary around a point.



$$a + b + c + d = 360^\circ$$

4 VERTICALLY OPPOSITE ANGLES

- When two straight lines cross, the opposite angles are equal.
- They are called vertically opposite angles.

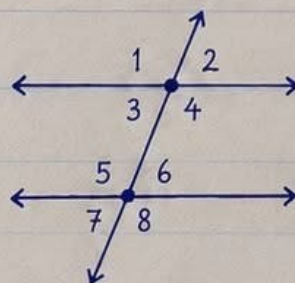


Vertically opposite angles are equal.

$$a = a \text{ and } b = b$$

5 CORRESPONDING ANGLES (PARALLEL LINES)

- When a transversal cuts two parallel lines, corresponding angles are equal.

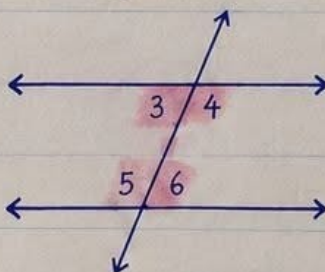


Corresponding angles are equal.

$$1 = 5, \quad 2 = 6, \\ 3 = 7, \quad 4 = 8$$

6 CO-INTERIOR (SAME-SIDE INTERIOR) ANGLES

- When a transversal cuts two parallel lines, co-interior angles add up to 180° .



Co-interior angles add up to 180° .

$$3 + 5 = 180^\circ \\ 4 + 6 = 180^\circ$$

IMPORTANT RULES TO REMEMBER:

- * Angles on a straight line = 180°
- * Angles around a point = 360°
- * Vertically opposite angles are equal.
- * Corresponding angles (parallel lines) are equal.
- * Co-interior angles (same-side interior) add up to 180° .

Remember:

Use these rules to find missing angles.





Polynomials : Important Notes



1. BASICS :

- ⇒ A polynomial is an expression with variables and coefficients, using '+', '-', 'x', '÷' and non-negative integer powers of variables.
- ⇒ Degree of a polynomial = Highest power of the variable.
- ⇒ Terms = Parts of a polynomial separated by '+' or '-'.
- ⇒ Like terms = Same variables with same power.
- ⇒ Unlike terms = Different variables or different powers.

TYPES :



1. Monomial (One term)
2. Binomial (Two terms)
3. Trinomial (Three terms)



2. RULES FOR ADDING & SUBTRACTING :

- ✓ Add or subtract the coefficients of like terms.
- ✓ Unlike terms cannot be combined.
- ✓ Write the answer in standard form.
- ✓ Arrange terms in descending order of powers.

Tip :

Practice regularly
to make it

✦ PERFECT !



3. EXAMPLES :

$$\textcircled{1} \quad (3x^2 + 5x - 2) + (2x^2 - x + 7)$$

$$\begin{array}{r} 3x^2 \quad + 5x \quad - 2 \\ + 2x^2 \quad - x \quad + 7 \\ \hline 5x^2 + 4x + 5 \end{array}$$

$$\textcircled{2} \quad (4a^2 - 3a + 6) - (a^2 + 5a - 2)$$

$$\begin{array}{r} 4a^2 \quad - 3a \quad + 6 \\ - a^2 \quad - 5a \quad + 2 \\ \hline 3a^2 - 8a + 8 \end{array}$$

$$\textcircled{3} \quad (2x^3 - x^2 + 7x - 4) + (x^3 + 3x^2 - 2x + 1)$$

$$\begin{array}{r} 2x^3 \quad - x^2 \quad + 7x \quad - 4 \\ + x^3 \quad + 3x^2 \quad - 2x \quad + 1 \\ \hline 3x^3 + 2x^2 + 5x - 3 \end{array}$$

$$\textcircled{4} \quad (5y^3 - 2y^2 + y - 6) - (2y^3 + y^2 - 4y + 8)$$

$$\begin{array}{r} 5y^3 \quad - 2y^2 \quad + y \quad - 6 \\ - 2y^3 \quad - y^2 \quad + 4y \quad - 8 \\ \hline 3y^3 - 3y^2 + 5y - 14 \end{array}$$

4. IMPORTANT POINTS :



- ★ Always look for like terms.
- ★ Change the sign of all terms inside the bracket while subtracting.
- ★ Do not change the sign while adding.
- ★ Write the final answer in descending order of powers.

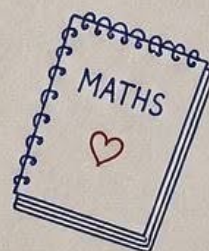
5. REMEMBER :

+ keeps the sign the same

- changes the sign

$$x^n + x^n = 2x^n$$

$$x^n - x^n = 0$$



Practice makes perfect. Keep solving, keep growing ! 😊



Stay Focused

Stay Consistent

Success is Yours



Quadratic Formula



SOLVE ANY QUADRATIC EQUATION IN 10 SECONDS!

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

This formula is a LIFESAVER!



WHEN TO USE?

Use this formula when the quadratic equation is in the form:

$$ax^2 + bx + c = 0$$

where $a \neq 0$

WHERE,

a = coefficient of x^2

b = coefficient of x

c = constant term

DISCRIMINANT (D)

$$D = b^2 - 4ac$$

- $D > 0 \rightarrow$ two real and distinct roots
- $D = 0 \rightarrow$ two real and equal roots
- $D < 0 \rightarrow$ two complex roots

EXAMPLE

Solve: $2x^2 + 5x - 3 = 0$

Here, $a = 2$, $b = 5$, $c = -3$

$$D = b^2 - 4ac$$

$$= (5)^2 - 4(2)(-3)$$

$$= 25 + 24 = 49$$

$$x = \frac{-5 \pm \sqrt{49}}{2(2)} = \frac{-5 \pm 7}{4}$$

$$x = \frac{-5+7}{4} \quad \text{or} \quad x = \frac{-5-7}{4}$$

$$x = \frac{1}{2} \quad \text{or} \quad x = -3$$

SAVE THIS FOR EXAMS!



Practice makes perfect.
Keep solving, keep growing. ♥



STAY FOCUSED, STAY CONSISTENT, SUCCEED. ♥