



FORMULA SHEET · CLASS 10

CBSE Class 10 Maths Formulas

All the formulas in the NCERT Class 10 Mathematics book, in chapter order, with the trigonometry table and the statistics formulas students most often mix up.

CBSE 10

01 Real numbers and polynomials

HCF and LCM – $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$

Irrational numbers – $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ and $\sqrt{p}$ for any prime p are irrational

Quadratic polynomial $ax^2 + bx + c$ – sum of zeros $\alpha + \beta = -b/a$, product $\alpha\beta = c/a$

Building a quadratic – $x^2 - (\text{sum of zeros})x + (\text{product of zeros})$

02 Pair of linear equations

Unique solution (lines intersect) – $a_1/a_2 \neq b_1/b_2$

No solution (parallel lines) – $a_1/a_2 = b_1/b_2 \neq c_1/c_2$

Infinitely many solutions (same line) – $a_1/a_2 = b_1/b_2 = c_1/c_2$

03 Quadratic equations

Quadratic formula – $x = [-b \pm \sqrt{(b^2 - 4ac)}]/2a$

Discriminant – $D = b^2 - 4ac$

Nature of roots – $D > 0$ two distinct real roots; $D = 0$ two equal roots; $D < 0$ no real roots

04 Arithmetic progressions

n th term – $a_n = a + (n - 1)d$

Sum of n terms – $S_n = (n/2)[2a + (n - 1)d] = (n/2)(a + l)$

Finding a term from sums – $a_n = S_n - S_{n-1}$

05 Triangles and coordinate geometry

Basic proportionality theorem – if $DE \parallel BC$ in triangle ABC , then $AD/DB = AE/EC$

Similarity criteria – AAA (AA), SSS, SAS

Pythagoras – $\text{hypotenuse}^2 = \text{base}^2 + \text{perpendicular}^2$

Distance – $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Section formula (ratio $m:n$) – $[(mx_2 + nx_1)/(m + n), (my_2 + ny_1)/(m + n)]$

Midpoint – $[(x_1 + x_2)/2, (y_1 + y_2)/2]$

06 Trigonometric values

	0°	30°	45°	60°	90°
sin	0	1/2	1/√2	√3/2	1
cos	1	√3/2	1/√2	1/2	0
tan	0	1/√3	1	√3	not defined

07 Trigonometry

Ratios – $\sin\theta = P/H$, $\cos\theta = B/H$, $\tan\theta = P/B = \sin\theta/\cos\theta$

Reciprocals – $\text{cosec}\theta = 1/\sin\theta$, $\sec\theta = 1/\cos\theta$, $\cot\theta = 1/\tan\theta$

Identities – $\sin^2\theta + \cos^2\theta = 1$; $1 + \tan^2\theta = \sec^2\theta$; $1 + \cot^2\theta = \text{cosec}^2\theta$

Heights and distances – $\tan(\text{angle of elevation}) = \text{height/horizontal distance}$

08 Circles and areas

Tangents – a tangent is perpendicular to the radius at the point of contact; tangents from an outside point are equal

Circle – circumference $2\pi r$, area πr^2

Arc of angle θ – length $(\theta/360^\circ) \times 2\pi r$

Sector of angle θ – area $(\theta/360^\circ) \times \pi r^2$

Segment – area of sector – area of the triangle

09 Surface areas and volumes

Cuboid – TSA $2(lb + bh + hl)$, volume lbh

Cube – TSA $6a^2$, volume a^3

Cylinder – CSA $2\pi rh$, TSA $2\pi r(r + h)$, volume $\pi r^2 h$

Cone – slant height $l = \sqrt{r^2 + h^2}$, CSA πrl , TSA $\pi r(l + r)$, volume $\frac{1}{3}\pi r^2 h$

Sphere – surface area $4\pi r^2$, volume $(4/3)\pi r^3$

Hemisphere – CSA $2\pi r^2$, TSA $3\pi r^2$, volume $(2/3)\pi r^3$

10 Statistics and probability

Mean (direct) – $\bar{x} = \sum f_i x_i / \sum f_i$

Mean (assumed mean) – $\bar{x} = a + \sum f_i d_i / \sum f_i$, $d_i = x_i - a$

Median – $l + [(n/2 - cf)/f] \times h$

Mode – $l + [(f_1 - f_0)/(2f_1 - f_0 - f_2)] \times h$

Empirical relation – $3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$

Probability – $P(E) = \text{favourable outcomes} / \text{total outcomes}$; $0 \leq P(E) \leq 1$; $P(\text{not } E) = 1 - P(E)$

Useful counts – a deck has 52 cards, 26 red, 12 face cards; two dice give 36 outcomes

How to use this sheet

- 1 In the board paper, write the formula first, then substitute: step marks reward it.
- 2 Draw a figure for every geometry and trigonometry question, even if the paper does not ask.
- 3 Learn the trig table by its pattern: sin goes 0, 1, 2, 3, 4 under $\sqrt{\quad}$ divided by 2.

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