

CBSE Class 10 Maths — Formula Sheet

Every key formula, chapter by chapter | examfront Learning Hub

Real Numbers

- **Fundamental Theorem of Arithmetic** (theorem): every composite number is a unique product of primes.
- $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$

Polynomials

- Quadratic $ax^2 + bx + c$, zeros α, β :
- Sum of zeros: $\alpha + \beta = -b/a$
- Product of zeros: $\alpha\beta = c/a$

Pair of Linear Equations

- Unique solution: $a_1/a_2 \neq b_1/b_2$
- Infinite solutions: $a_1/a_2 = b_1/b_2 = c_1/c_2$
- No solution: $a_1/a_2 = b_1/b_2 \neq c_1/c_2$

Quadratic Equations

- Quadratic formula: $x = [-b \pm \sqrt{b^2 - 4ac}] / 2a$
 - Discriminant: $D = b^2 - 4ac$
 - $D > 0$: two distinct real roots $D = 0$: two equal roots $D < 0$: no real roots
- Divide the whole numerator by $2a$, not just the root.

Arithmetic Progressions

- nth term: $a_n = a + (n - 1)d$
- Sum: $S_n = (n/2)[2a + (n - 1)d]$
- Sum (last term l): $S_n = (n/2)(a + l)$

Coordinate Geometry

- Distance: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
 - Section (m:n): $((mx_2 + nx_1)/(m+n), (my_2 + ny_1)/(m+n))$
 - Midpoint: $((x_1 + x_2)/2, (y_1 + y_2)/2)$
- Square each difference before adding.

Triangles (theorems)

- **Basic Proportionality Theorem**: a line parallel to one side divides the other two sides in the same ratio.
- Areas of similar triangles are in the ratio of the squares of corresponding sides.

Introduction to Trigonometry

- $\sin\theta = \text{opp/hyp}$ $\cos\theta = \text{adj/hyp}$ $\tan\theta = \text{opp/adj} = \sin\theta/\cos\theta$
- $\text{cosec}\theta = 1/\sin\theta$ $\sec\theta = 1/\cos\theta$ $\cot\theta = 1/\tan\theta$
- Identities: $\sin^2\theta + \cos^2\theta = 1$ $1 + \tan^2\theta = \sec^2\theta$ $1 + \cot^2\theta = \text{cosec}^2\theta$

θ	0°	30°	45°	60°	90°
sin	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
cos	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
tan	0	$1/\sqrt{3}$	1	$\sqrt{3}$	—

■ $\sin^2\theta$ means $(\sin\theta)^2$, not $\sin(\theta^2)$.

Applications of Trigonometry

- Heights & distances via angle of elevation / depression (angles $30^\circ, 45^\circ, 60^\circ$).

Areas Related to Circles

- Area = πr^2 Circumference = $2\pi r$
- Sector area = $(\theta/360) \times \pi r^2$ Arc = $(\theta/360) \times 2\pi r$
- Segment = sector area – triangle area

Surface Areas and Volumes

Solid	Volume	Surface area
Cube	a^3	$6a^2$
Cuboid	lbh	$2(lb+bh+hl)$
Cylinder	$\pi r^2 h$	$2\pi r h + 2\pi r(r+h)$
Cone	$(1/3)\pi r^2 h$	$\pi r l + \pi r(r+l)$
Sphere	$(4/3)\pi r^3$	$4\pi r^2$
Hemisphere	$(2/3)\pi r^3$	$2\pi r^2 + 3\pi r^2$

Cone slant $l = \sqrt{r^2 + h^2}$. Combinations: add/subtract parts.

Statistics (grouped data)

- Mean (direct): $\bar{x} = \sum f_i x_i / \sum f_i$
- Mean (assumed): $\bar{x} = a + (\sum f_i d_i / \sum f_i)$
- Mode: $l + [(f_1 - f_0) / (2f_1 - f_0 - f_2)] \times h$
- Median: $l + [(n/2 - cf) / f] \times h$

Probability

- $P(E)$ = favourable outcomes / total outcomes
- $0 \leq P(E) \leq 1$ $P(\text{not } E) = 1 - P(E)$
- Probability is never greater than 1 or less than 0.