

Class 10 Maths — All Formulas

Every key CBSE formula, chapter by chapter — the sheet you revise from.

14 chapters · 7 units · 80 marks — **one sheet**

The eight to know cold

Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ · $D = b^2 - 4ac$
Nature of roots	D positive → two distinct roots · D zero → two equal · D negative → none
Zeros of ax^2+bx+c	$\alpha + \beta = -b/a$ · $\alpha\beta = c/a$
Distance	$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Section formula	$(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n})$ · midpoint at $m : n = 1 : 1$
Arithmetic progression	n -th term = $a + (n-1)d$ · Sum = $n/2 [2a + (n-1)d] = n/2 (a + l)$
Sector and arc	Area = $(\theta/360) \times \pi r^2$ · Arc = $(\theta/360) \times 2\pi r$
Probability	$P(E) = \text{favourable} / \text{total}$ · $0 \leq P(E) \leq 1$ · $P(\text{not } E) = 1 - P(E)$

Trigonometry — the table and the identities

θ	0°	30°	45°	60°	90°
$\sin \theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos \theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan \theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	not defined

Identities: $\sin^2\theta + \cos^2\theta = 1$ · $1 + \tan^2\theta = \sec^2\theta$ · $1 + \cot^2\theta = \operatorname{cosec}^2\theta$

Surface areas and volumes

Solid	Volume	Surface area
Cube (edge a)	a^3	$6a^2$
Cuboid ($l \times b \times h$)	lbh	$2(lb + bh + hl)$
Cylinder	$\pi r^2 h$	Curved $2\pi rh$ · Total $2\pi r(r + h)$
Cone	$(1/3)\pi r^2 h$	Curved πrl · Total $\pi r(r + l)$
Sphere	$(4/3)\pi r^3$	$4\pi r^2$
Hemisphere	$(2/3)\pi r^3$	Curved $2\pi r^2$ · Total $3\pi r^2$

Slant height of a cone: $l = \sqrt{r^2 + h^2}$. For combined solids, add or subtract the parts.

Key takeaways

- A formula sheet is for **recall, not first learning** — cover a section and write it out from memory.
- Trigonometry, Coordinate Geometry and Mensuration** carry the most formulas — revise those first.
- In the quadratic formula the **whole numerator** sits over $2a$ — not just the square-root part.
- $\sin^2\theta$ means **$(\sin \theta)^2$** , not $\sin(\theta^2)$. Square the whole ratio.
- A formula earns marks only when you know **which question type it unlocks** — pair every one with an example.

Formulas in action

Two questions, six formulas — and the check that proves each answer.

Knowing the formula is step one. **Choosing the right one is the mark.**

WORKED EXAMPLE 1 · MENSURATION

A toy is a cone mounted on a hemisphere. Both have radius $r = 7$ cm and the cone's height is $h = 24$ cm. Find the total surface area. ($\pi = 22/7$)

Step 1 – slant height. $l = \sqrt{(r^2 + h^2)} = \sqrt{(49 + 576)} = \sqrt{625} = 25$ cm.

Step 2 – curved surface of the cone. $\pi rl = (22/7)(7)(25) = 550$ cm².

Step 3 – curved surface of the hemisphere. $2\pi r^2 = 2(22/7)(49) = 308$ cm².

Step 4 – total. $550 + 308 = 858$ cm².

Check: the cone's flat base ($\pi r^2 = 154$ cm²) is glued to the hemisphere — add it and you lose the mark.

WORKED EXAMPLE 2 · COORDINATE GEOMETRY

For A(2, 3) and B(6, 7), find AB, the midpoint of AB, and the point P dividing AB in the ratio 1 : 3.

Step 1 – distance. $AB = \sqrt{(6-2)^2 + (7-3)^2} = \sqrt{(16+16)} = \sqrt{32} = 4\sqrt{2}$ units.

Step 2 – midpoint. $((2+6)/2, (3+7)/2) = (4, 5)$.

Step 3 – section formula, $m : n = 1 : 3$. $((1 \times 6 + 3 \times 2)/4, (1 \times 7 + 3 \times 3)/4) = (12/4, 16/4) = (3, 4)$.

Check: $AP = \sqrt{(1+1)} = \sqrt{2}$, and $\sqrt{2}$ is exactly one quarter of $4\sqrt{2}$ — so P really does sit 1 : 3 along AB.

WHERE FORMULA MARKS ARE ACTUALLY LOST

- Adding a surface that isn't there.** In combined solids, the joined faces vanish — count only what you could paint.
- Swapping m and n.** In the section formula the ratio $m : n$ multiplies the **far** point first: $mx_2 + nx_1$.
- Squaring after adding.** The distance formula squares each difference **before** the addition.
- Skipping the formula line.** Writing the formula before substituting earns a method mark even if the arithmetic then slips.

NOW TRY THESE

(a) A cone has $r = 5$ cm and $h = 12$ cm. Find its slant height and curved surface area. ($\pi = 3.14$)

(b) Find the point dividing $(-1, 3)$ and $(4, -2)$ in the ratio 2 : 3.

Answers: (a) $l = 13$ cm, $CSA = 204.1$ cm² · (b) (1, 1)

THREE PAIRS STUDENTS SWAP UNDER PRESSURE

Curved vs total surface area. "Total" adds the flat faces; an open shape painted outside needs **curved** only.

Sector area vs arc length. Same fraction $\theta/360$, different circle formula — $\times \pi r^2$ for area, $\times 2\pi r$ for length.

Mode vs median. Both begin $l + [\dots] \times h$. Mode uses the frequencies f_0, f_1, f_2 around the modal class; median uses $n/2$ and cf.

Turn formula recall into real marks

A sheet tells you the formula. **examfront** tells you whether you can use it under exam pressure.

- **Chapter 1 free** — start practising today, no payment needed.
- **Mistake identification** — see whether you lost the mark on recall, method or arithmetic.
- **Anytime tests** — a quick set on any chapter, whenever you have twenty minutes.
- **Weekly tests** — steady, spaced practice so formulas stay fresh instead of fading.
- **Mock tests before the exam** — full papers under real timing, so board day is a repeat.

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