

Class 8 Maths

Complete Formula Sheet

NCERT / CBSE Curriculum

Chapters 1–13 • All Important Formulas & Identities

MathsFormula.in • Free for Students

How to use: This formula sheet covers all key formulas from NCERT Class 8 Maths. Each chapter's formulas are grouped together. Study one chapter at a time and tick off formulas as you memorize them!

Chapter 1: Rational Numbers

Additive Inverse

Additive inverse of $p/q = -p/q$

$a + (-a) = 0$

Multiplicative Inverse

Reciprocal of $p/q = q/p$

$a \times (1/a) = 1$

Rational between a & b

$n = (a + b) / 2$

Mean / average method

Distributive Property

$a(b + c) = ab + ac$

Works for all rationals

Commutative (add)

$a + b = b + a$

Order doesn't matter

Associative (add)

$(a+b)+c = a+(b+c)$

Grouping doesn't matter

Chapter 2: Linear Equations in One Variable

Standard Form

$ax + b = 0$

a, b are constants; x is variable

Solution

$x = -b / a$

Isolate x on one side

Cross Multiplication

$a/b = c/d \Rightarrow ad = bc$

For equations in fraction form

Sum of angles (triangle)

$A + B + C = 180 \text{ degrees}$

Application of linear eq.

Consecutive integers

$n, n+1, n+2$

Three consecutive integers

Consecutive even/odd

$n, n+2, n+4$

Even or odd consecutive

Chapter 3: Understanding Quadrilaterals

Sum of interior angles

$$(n - 2) \times 180 \text{ degrees}$$

n = number of sides

Each interior angle (regular)

$$[(n-2) \times 180] / n$$

For regular polygon

Each exterior angle (regular)

$$360 / n$$

Sum of exterior angles = 360

Sum of exterior angles

$$= 360 \text{ degrees}$$

Always, for any convex polygon

Parallelogram: Area

$$A = \text{base} \times \text{height}$$

Opposite sides are equal

Rhombus: Area

$$A = (d1 \times d2) / 2$$

$d1, d2$ = diagonals

Rectangle: Area

$$A = \text{length} \times \text{breadth}$$

Perimeter = $2(l + b)$

Square: Area

$$A = \text{side squared} (a^2)$$

Perimeter = $4a$

Trapezium: Area

$$A = (1/2)(a + b) \times h$$

a, b = parallel sides, h = height

Kite: Area

$$A = (d1 \times d2) / 2$$

Diagonals perpendicular

Chapter 4: Data Handling & Probability

Mean

$$\text{Mean} = \text{Sum of observations} / \text{Total observations}$$

Mode

Value that appears most frequently

Can have more than one mode

Median (odd n)

Middle value when sorted

$((n+1)/2)$ th term

Median (even n)

Average of two middle values

$(n/2$ and $n/2+1)$ th terms

Probability

$$P(E) = \text{Favourable outcomes} / \text{Total outcomes}$$

$0 \leq P(E) \leq 1$

Complement

$$P(\text{not } E) = 1 - P(E)$$

$P(E) + P(\text{not } E) = 1$

Pie Chart angle

$$\text{Angle} = (\text{Value} / \text{Total}) \times 360 \text{ degrees}$$

For each sector

Chapter 5: Squares and Square Roots

Perfect Square

$$n^2 = n \times n$$

1,4,9,16,25,36,49,64,81,100...

Square of sum

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

Algebraic identity

Square of difference

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

Algebraic identity

Pythagorean triplet

$$m^2-1, 2m, m^2+1$$

For any $m > 1$ **Square root property**

$$\text{sqrt}(ab) = \text{sqrt}(a) \times \text{sqrt}(b)$$

Product rule

Square root property 2

$$\text{sqrt}(a/b) = \text{sqrt}(a) / \text{sqrt}(b)$$

Quotient rule

Estimate sqrt(n)**Between sqrt(p) and sqrt(q)**Where $p < n < q$ **Chapter 6: Cubes and Cube Roots****Perfect Cube**

$$n^3 = n \times n \times n$$

1,8,27,64,125,216,343...

Cube of sum

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

Expand fully

Cube of difference

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

Expand fully

Sum of cubes

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

Factorisation

Diff of cubes

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

Factorisation

Cube root property

$$\text{cbrrt}(ab) = \text{cbrrt}(a) \times \text{cbrrt}(b)$$

Product rule

Chapter 7: Comparing Quantities

Percentage

$$\% = (\text{Part} / \text{Whole}) \times 100$$

Basic formula

Increase %

$$= (\text{Increase} / \text{Original}) \times 100$$

Growth percent

Decrease %

$$= (\text{Decrease} / \text{Original}) \times 100$$

Reduction percent

Profit %

$$= (\text{Profit} / \text{CP}) \times 100$$

CP = Cost Price

Loss %

$$= (\text{Loss} / \text{CP}) \times 100$$

SP (profit)

$$\text{SP} = \text{CP} \times (100 + \text{P}\%) / 100$$

Selling price with profit

SP (loss)

$$\text{SP} = \text{CP} \times (100 - \text{L}\%) / 100$$

Selling price with loss

Discount

$$= \text{Marked Price} - \text{Selling Price}$$

Discount %

$$= (\text{Discount} / \text{MP}) \times 100$$

MP = Marked Price

SP after discount

$$\text{SP} = \text{MP} \times (100 - \text{d}\%) / 100$$

d = discount %

Simple Interest

$$\text{SI} = (\text{P} \times \text{R} \times \text{T}) / 100$$

P=Principal, R=Rate, T=Time(yrs)

Amount (SI)

$$\text{A} = \text{P} + \text{SI}$$

Total amount

Compound Interest

$$\text{A} = \text{P}(1 + \text{R}/100)^n$$

n = number of years

CI half-yearly

$$\text{A} = \text{P}(1 + \text{R}/200)^{2n}$$

Rate halved, period doubled

CI Formula

$$\text{CI} = \text{A} - \text{P}$$

Compound Interest earned

GST Amount

$$\text{GST} = (\text{GST}\% / 100) \times \text{Price}$$

Tax on value of goods

Chapter 8: Algebraic Expressions and Identities

Identity 1

$$(\text{a} + \text{b})^2 = \text{a}^2 + 2\text{ab} + \text{b}^2$$

Square of a sum — most important!

Identity 2

$$(\text{a} - \text{b})^2 = \text{a}^2 - 2\text{ab} + \text{b}^2$$

Square of a difference

Identity 3

$$\text{a}^2 - \text{b}^2 = (\text{a} + \text{b})(\text{a} - \text{b})$$

Difference of squares

Identity 4

$$(\text{x} + \text{a})(\text{x} + \text{b}) = \text{x}^2 + (\text{a} + \text{b})\text{x} + \text{ab}$$

Product of two binomials

$$(a+b+c)^2$$

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

Square of trinomial

Monomial x Monomial

Multiply coefficients & add powers

e.g. $3x^2 \times 2x^3 = 6x^5$

Chapter 9: Mensuration

Trapezium: Area

$$A = (1/2)(a + b) \times h$$

a, b = parallel sides, h = height

General Quad: Area

$$A = (1/2) \times d \times (h_1 + h_2)$$

d = diagonal, h₁, h₂ = heights

Rhombus: Area

$$A = (d_1 \times d_2) / 2$$

d₁, d₂ = diagonals

Cube: Volume

$$V = a^3$$

a = edge length

Cube: TSA

$$TSA = 6a^2$$

Total Surface Area

Cube: LSA

$$LSA = 4a^2$$

Lateral Surface Area

Cuboid: Volume

$$V = l \times b \times h$$

length x breadth x height

Cuboid: TSA

$$TSA = 2(lb + bh + lh)$$

Total Surface Area

Cuboid: LSA

$$LSA = 2h(l + b)$$

Lateral Surface Area

Cylinder: Volume

$$V = \pi r^2 h$$

pi = 22/7 or 3.14

Cylinder: CSA

$$CSA = 2 \pi r h$$

Curved Surface Area

Cylinder: TSA

$$TSA = 2 \pi r (r + h)$$

Total Surface Area

Capacity/Volume

$$1 \text{ mL} = 1 \text{ cm}^3$$

$$1 \text{ L} = 1000 \text{ cm}^3$$

Chapter 10: Exponents and Powers

Product Rule

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

Same base, add powers

Quotient Rule

$$a^m / a^n = a^{m-n}$$

Same base, subtract powers

Power of Power

$$(a^m)^n = a^{mn}$$

Multiply the powers

Zero Exponent

$$a^0 = 1$$

Any base (except 0) to power 0 = 1

Negative Exponent

$$a^{-n} = 1 / a^n$$

Negative power = reciprocal

Product to Power

$$(ab)^n = a^n b^n$$

Distribute power to each

Standard Form

$$m \times 10^n$$

$1 \leq m < 10$, n is integer

Fraction Power

$$(a/b)^n = a^n/b^n$$

Chapter 11: Direct and Inverse Proportions

Direct Proportion

$$x/y = k \text{ (constant)}$$

As x increases, y increases

Direct Proportion 2

$$x_1/y_1 = x_2/y_2$$

Cross multiply to solve

Inverse Proportion

$$x \times y = k \text{ (constant)}$$

As x increases, y decreases

Inverse Proportion 2

$$x_1 \times y_1 = x_2 \times y_2$$

Product remains constant

Speed-Time-Distance

$$\text{Distance} = \text{Speed} \times \text{Time}$$

Direct proportion example

Unitary Method

Find value for 1 unit, then scale

Base of all proportion

Chapter 12: Factorisation

Common Factor

$$ab + ac = a(b + c)$$

Take out HCF

Regrouping

$$ab+ac+db+dc = a(b+c)+d(b+c)$$

Group and factor

Identity 1 (reverse)

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

Recognize perfect squares

Identity 2 (reverse)

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

Identity 3 (reverse)

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

Identity 4 (reverse)

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

Middle term splitting

Chapter 13: Introduction to Graphs

Coordinates

$$(x, y) = \text{(horizontal, vertical)}$$

x = abscissa, y = ordinate

Origin

$$O = (0, 0)$$

Intersection of axes

Linear Graph

$$y = mx + c$$

m = slope, c = y -intercept

Direct variation graph

$$y = kx$$

Straight line through origin

Quadrants

Q1:(+,+) Q2:(-,+) Q3:(-,-) Q4:(+,-)

Anticlockwise from Q1

Distance from x-axis

$|y|$ = perpendicular distance

Quick Reference — Important Values

Value	Number	Value	Number
pi (approx)	3.14159 (22/7)	sqrt(2)	1.414
sqrt(3)	1.732	sqrt(5)	2.236
1 km	1000 m	1 m	100 cm
1 kg	1000 g	1 L	1000 mL
1 hr	60 min	1 min	60 sec
1 year	365 days	1 dozen	12
% to decimal	Divide by 100	Decimal to %	Multiply by 100