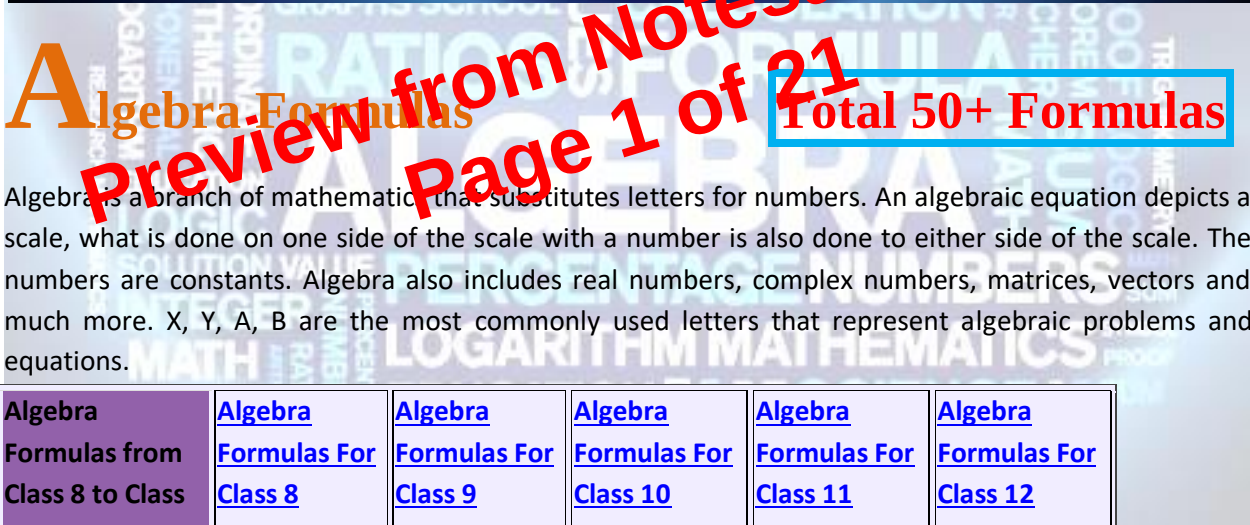


50+

Page 1 of 21



Algebra Formulas from Class 8 to Class 12	Algebra Formulas For Class 8	Algebra Formulas For Class 9	Algebra Formulas For Class 10	Algebra Formulas For Class 11	Algebra Formulas For Class 12

"Elementary Algebra" by Charles P. McKeague, Algebra for College Students" by Mark Dugopolski, "Higher Algebra" by Hall & Knight, "College Algebra" by James Stewart, Lothar Redlin, and Saleem Watson, "Schaum's Outline of College Algebra" by Murray Spiegel, Khan Academy (www.khanacademy.org), Paul's Online Math Notes (tutorial.math.lamar.edu)

Algebra formulas **50+**

Total 50+ Formulas... Page 10 of 21

1. $|x|=a \Rightarrow x=a$ or $x=-a$. $|x|=a \implies x=a$ or $x=-a$.
2. For $a, b > 0$, $b > 0$, $b > 0$: $|a+b| \leq |a| + |b|$ (Triangle Inequality). $|a+b| \leq |a| + |b|$ (Triangle Inequality).
3. Quadratic inequality: $ax^2+bx+c > 0$ or $ax^2+bx+c < 0$, $ax^2 + bx + c > 0$ or $ax^2 + bx + c < 0$, solved using sign charts or graphing.

20. Higher-Degree Polynomial Factorization

1. Polynomial division:
 - For $P(x)$ divided by $(x-a)$, the remainder is $P(a)$.
2. Factor theorem:
 - If $P(a)=0$, then $(x-a)$ is a factor of $P(x)$.

21. Arithmetic-Geometric Means

1. Arithmetic mean (AM) of n numbers: $AM = \frac{a_1 + a_2 + \dots + a_n}{n}$.
2. Geometric mean (GM) of n numbers: $GM = \sqrt[n]{a_1 \cdot a_2 \cdot \dots \cdot a_n}$.
3. Relationship: $AM \geq GM$.

22. Modular Arithmetic

Rules for mod operations:

1. $(a+b) \mod n = [(a \mod n) + (b \mod n)] \mod n$.
2. $(a \cdot b) \mod n = [(a \mod n) \cdot (b \mod n)] \mod n$.

23. Exponential Equations

1. If $a^x = a^y$, then $x = y$ (if $a > 0$ and $a \neq 1$).
2. For equations involving different bases, use logarithms to solve: $ax = b \Rightarrow x = \log_a b$.

24. Advanced Progressions

Reference: Books,

"Elementary Algebra" by Charles P. McKeague, "Algebra for College Students" by Mark Dugopolski, "Higher Algebra" by Hall & Knight, "College Algebra" by James Stewart, Lothar Redlin, and Saleem Watson, "Schaum's Outline of College Algebra" by Murray Spiegel, Khan Academy (www.khanacademy.org), Paul's Online Math Notes (tutorial.math.lamar.edu)

Algebra formulas 50+

Total 50+ Formulas... Page 14 of 21

For a polynomial $P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_0$
 $P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_0$
 Any rational root is of the form:

$$pq, \frac{p}{q}, qp,$$

where p divides the constant term a_0 and q divides the leading coefficient a_n .

38. Advanced Modular Arithmetic

1. Fermat's Little Theorem: $a^{p-1} \equiv 1 \pmod{p}$ (if p is prime).
2. Euler's Totient Function:
 $\phi(n)$ = Number of integers k such that $1 \leq k \leq n$ and $\gcd(k, n) = 1$.
 $\phi(n)$ = Number of integers k such that $1 \leq k \leq n$ and $\gcd(k, n) = 1$.

39. Properties of Absolute Values

1. Inequalities involving absolute values: $|x+y| \leq |x| + |y|$ (Triangle Inequality).
2. Square root property: $|x| = \sqrt{x^2}$.

40. Advanced Algebraic Concepts

1. **Homogeneous Equations:** For equations where all terms are of the same degree, substitution $x = ky$ simplifies the equation.
2. **Parametric Equations:** Represent curves using parameters t : $x = f(t), y = g(t)$.

41. Advanced Binomial Theorem

1. Expansion of $(a+b)^n$:

$$(a+b)^n = \sum_{k=0}^n \binom{n}{k} a^{n-k} b^k$$

Reference: Books,

"Elementary Algebra" by Charles P. McKeague, "Algebra for College Students" by Mark Dugopolski, "Higher Algebra" by Hall & Knight, "College Algebra" by James Stewart, Lothar Redlin, and Saleem Watson, "Schaum's Outline of College Algebra" by Murray Spiegel, Khan Academy (www.khanacademy.org), Paul's Online Math Notes (tutorial.math.lamar.edu)