

College Algebra Cheat Sheet

Formula Sheet for College Algebra Final Exam		
Properties of Exponents 1. $a^m a^n = a^{m+n}$ 2. $\frac{a^m}{a^n} = a^{m-n}$ 3. $(a^m)^n = a^{mn}$ 4. $(a^m b^n)^p = a^{mp} b^{np}$ 5. $\left(\frac{a^m}{b^n}\right)^p = \frac{a^{mp}}{b^{np}}$ 6. $b^{-p} = \frac{1}{b^p}$	Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Circle $(x-h)^2 + (y-k)^2 = r^2$ center = (h, k) radius = r Vertex of Parabola $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ $f(x) = a(x-h)^2 + k$ Vertex at (h, k)	Standard Form of Equation of Parabola $(x-h)^2 = 4p(y-k)$ vertex = (h, k) focus = $(h, k+p)$ directrix: $y = k-p$ $(y-k)^2 = 4p(x-h)$ vertex = (h, k) focus = $(h+p, k)$ directrix: $x = h-p$
Properties of Logarithms 1. $y = \log_b x \iff b^y = x$ 2. $\log_b b = 1$ 3. $\log_b b^x = x$ 4. $\log_b 1 = 0$ 5. $b^{\log_b x} = x$	6. $\log_b m^p = p \log_b m$ 7. $\log_b (mn) = \log_b m + \log_b n$ 8. $\log_b \left(\frac{m}{n}\right) = \log_b m - \log_b n$	9. $\log(a) = \log_{10}(a)$ 10. $\ln(a) = \log_e(a)$ Change of Base Formula $\log_b x = \frac{\log_{10} x}{\log_{10} b} = \frac{\ln x}{\ln b}$
Properties of Radicals 1. $(\sqrt[n]{b})^m = \sqrt[n]{b^m} = b^{\frac{m}{n}}$ 2. $\sqrt[n]{a} \sqrt[n]{b} = \sqrt[n]{ab}$ 3. $\sqrt[n]{\sqrt[n]{b}} = \sqrt[n^2]{b}$ 4. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}, b \neq 0$	Absolute Value Inequalities $ E \leq k \iff -k \leq E \leq k$ $ E \geq k \iff E \leq -k \text{ or } E \geq k$ Midpoint Formula $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	Distance Formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ Equations for Graphing Lines $m = \frac{y_2 - y_1}{x_2 - x_1}, y = mx + b$ $y - y_1 = m(x - x_1)$
Interest Formulas compound $A = P \left(1 + \frac{r}{n}\right)^n$ continuous $A = Pe^{rt}$		

Remainder Theorem: For any Poly. $P(x)$, the remainder obtained when dividing $P(x)$ by $x - r$ is $P(r)$.

Rational Root Theorem: Let $P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$, where all coefficients are

integers and n is a positive integer. If $\frac{c}{d}$ is a root of $P(x)$ then c is a factor of a_0 and d is a factor of a_n .

College Algebra Cheat Sheet: Conquer Your Math Challenges

Are you staring down the barrel of a college algebra exam, feeling overwhelmed and unsure where to begin? Do formulas blur together, and do you find yourself wishing for a quick, reliable reference guide? This comprehensive college algebra cheat sheet is designed to be your ultimate lifeline, providing a concise yet thorough overview of key concepts, formulas, and problem-solving strategies. Forget endless hours of cramming; this guide is your shortcut to success. We'll cover everything from fundamental operations to advanced topics, ensuring you're equipped to tackle any algebra problem with confidence.

1. Essential Number Systems and Properties

Understanding the foundation is key. This section covers the basic building blocks of algebra:

Real Numbers: This includes rational (fractions, decimals) and irrational (e.g., π , $\sqrt{2}$) numbers. Remember the number line – a visual representation that helps understand their order and relationships.

Properties of Real Numbers: Brush up on the commutative, associative, and distributive properties. These are fundamental to simplifying and manipulating algebraic expressions. Knowing when and how to apply them is crucial.

Order of Operations (PEMDAS/BODMAS): Parentheses/Brackets, Exponents/Orders, Multiplication and Division (from left to right), Addition and Subtraction (from left to right). This ensures consistent calculations, avoiding common errors.

2. Solving Linear Equations and Inequalities

Linear equations form the backbone of many algebraic concepts. Mastering them is essential:

Solving Linear Equations: The goal is to isolate the variable (usually x). Use inverse operations (addition/subtraction, multiplication/division) to achieve this. Remember, whatever you do to one side of the equation, you must do to the other.

Solving Linear Inequalities: Similar to equations, but with an inequality symbol ($<$, $>$, $\leq$, $\geq$). Remember that multiplying or dividing by a negative number reverses the inequality sign.

Graphing Linear Equations: Representing linear equations visually on a coordinate plane.

Understanding slope-intercept form ($y = mx + b$) and point-slope form is vital for graphing and interpreting linear relationships.

3. Working with Polynomials

Polynomials are expressions with multiple terms involving variables raised to different powers:

Adding and Subtracting Polynomials: Combine like terms (terms with the same variable and exponent).

Multiplying Polynomials: Use the distributive property (FOIL method for binomials).

Factoring Polynomials: Reverse of multiplication. Learn to factor out common factors, difference of squares, and quadratic expressions (e.g., using the quadratic formula or factoring by grouping).

4. Quadratic Equations and Functions

Quadratic equations are equations of degree 2 (highest power of the variable is 2):

Solving Quadratic Equations: Methods include factoring, the quadratic formula ($x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$), and completing the square.

Graphing Quadratic Functions: Parabolas - understanding their vertex, axis of symmetry, and intercepts is essential for visualizing and interpreting quadratic relationships.

Discriminant ($b^2 - 4ac$): This part of the quadratic formula determines the nature of the roots (real and distinct, real and equal, or complex).

5. Systems of Linear Equations

These involve solving for multiple variables simultaneously:

Substitution Method: Solve one equation for one variable and substitute it into the other equation.

Elimination Method (Addition/Subtraction Method): Manipulate the equations to eliminate one variable by adding or subtracting them.

Graphical Method: Find the point of intersection of the lines representing the equations.

6. Exponents and Radicals

Understanding exponents and radicals is crucial for simplifying expressions:

Exponent Rules: Learn the rules for multiplying, dividing, raising to a power, and negative exponents.

Radical Rules: Simplifying radicals, rationalizing the denominator, and converting between exponential and radical forms.

7. Functions and Their Graphs

Functions represent relationships between inputs and outputs:

Function Notation ($f(x)$): Understanding how to evaluate functions and find their domain and range.

Graphing Functions: Identifying key features like intercepts, asymptotes, and increasing/decreasing intervals.

Types of Functions: Linear, quadratic, polynomial, exponential, logarithmic - understanding their properties and graphs.

Conclusion

This college algebra cheat sheet provides a streamlined overview of essential concepts and formulas. While it's not a replacement for thorough study and practice, it serves as a valuable tool for quick reference, review, and exam preparation. Remember, consistent practice and understanding the underlying principles are key to mastering college algebra. Use this cheat sheet as a guide to navigate the complexities of the subject and confidently tackle your next algebra challenge.

FAQs

1. Is this cheat sheet enough to ace my algebra exam? This cheat sheet is a valuable study aid, but it's crucial to supplement it with regular practice problems and a strong understanding of the underlying concepts.
2. What if I'm struggling with a specific topic? This cheat sheet provides an overview. For in-depth explanations and examples, consult your textbook, lecture notes, or seek help from your professor or tutor.
3. Can I use this cheat sheet during an exam? This depends entirely on your professor's policies. Most exams prohibit the use of any external materials, including cheat sheets. Always check your syllabus.
4. Are there any online resources that complement this cheat sheet? Yes, many websites and online platforms offer practice problems, tutorials, and interactive lessons on college algebra.
5. How can I best use this cheat sheet for studying? Don't just passively read it. Actively engage with the material. Test yourself, work through examples, and identify areas where you need further clarification. Use it as a tool to guide your study sessions, not replace them.

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The final chapter deals with algebra of logic and its development into a two-value Boolean algebra as switching algebra. This book is intended to be suitable for students of technical schools, colleges, and universities.

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(with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the differential calculus) in the setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds.

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