10 High School Pre Calculus Concepts You Must Know for Success in Math!

PreCalculus Formulas

Sequences and Series:

Binomial Theorem	Arithmetic Last Term	Geometric Last Term
$(a+b)^n = \sum_{k=0}^{n}\binom{n}{k}a^{n-k}b^k$	$a_n = a_1 + (n-1)d$	$a_n = a_1 r^{n-1}$
Find the rth term	Arithmetic Partial Sum	Geometric Partial Sum
$\binom{n}{r-1}a^{n-(r-1)}b^{r-1}$	$S_n = n\left(\frac{a_1+a_n}{2}\right)$	$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$

Complex and Polars:

DeMoivre's Theorem:

$[r(\cos\theta + i\sin\theta)]^n = r^n(\cos n\theta + i\sin n\theta)$

$r = \sqrt{a^2 + b^2}$ $\qquad x = r\cos\theta$ $\qquad a+bi$

$\theta = \arctan\frac{b}{a}$ $\qquad y = r\sin\theta$ $\qquad i = \sqrt{-1}$ $i^2 = -1$

$(r,\theta) \to (x,y)$

Functions:

To find the inverse function $f^{-1}(x)$	Composition of functions
1. Set function = y 2. Interchange the variables 3. Solve for y	$(f \circ g)(x) = f(g(x))$ $(g \circ f)(x) = g(f(x))$ $(f \circ f^{-1})(x) = x$

Algebra of functions: $(f+g)(x) = f(x)+g(x)$; $(f-g)(x) = f(x)-g(x)$

$(f\cdot g)(x) = f(x)g(x)$; $(f/g)(x) = f(x)/g(x)$, $g(x) \neq 0$

Domain: $D(f(x)) \cap D(g(x))$

Domain (usable x's) Watch for problems with zero denominators and with negatives under radicals. Range (y's used)	Asymptotes: (vertical) Check to see if the denominator could ever be zero. $f(x) = \frac{x}{x^2+x-6}$	Asymptotes: (horizontal) 1. $f(x) = \frac{x+3}{x^2-2}$ top power < bottom power means y = 0 (x-axis)
Difference Quotient $\frac{f(x+h)-f(x)}{h}$ terms not containing a mult. of h will be eliminated.	Vertical asymptotes at $x = -3$ and $x = 2$	2. $f(x) = \frac{4x^2-5}{3x^2+4x+6}$ top power = bottom power means y = 4/3 (coefficients) 3. $f(x) = \frac{x^3}{x+4}$ None! top power > bottom power

Determinants:

$\begin{vmatrix} 3 & 5 \\ 4 & 3 \end{vmatrix} = 3\cdot3 - 5\cdot4$ Use your calculator for 3x3 determinants.

Cramer's Rule:

$ax + by = c$ $\qquad \frac{1}{\begin{vmatrix} a & b \\ d & e \end{vmatrix}}\left(\begin{vmatrix} c & b \\ f & e \end{vmatrix} \begin{vmatrix} a & c \\ d & f \end{vmatrix}\right)$

$dx + ey = f$

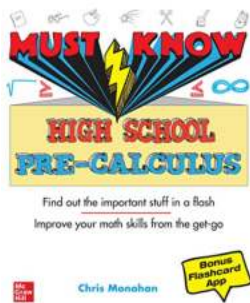Also apply Cramer's rule to 3 equations with 3 unknowns.

Trig

Reference Triangles:

$\sin\theta = \frac{a}{h}$; $\cos\theta = \frac{a}{h}$; $\tan\theta = \frac{a}{a}$ BowTie

$\csc\theta = \frac{h}{a}$; $\sec\theta = \frac{h}{a}$; $\cot\theta = \frac{a}{a}$

When it comes to high school math, pre calculus can often be a challenging subject. However, with the right knowledge and understanding of key concepts, you can set yourself up for success in this crucial area of mathematics. In this article, we will explore ten must-know high school pre calculus concepts that will help you excel in your math studies and beyond!

1. Functions and Graphs

Functions are vital in pre calculus as they represent how mathematical quantities relate to each other. Understanding functions, including linear, quadratic, exponential, and trigonometric functions, is essential for solving various mathematical problems. Graphs visually depict these functions and help in analyzing their properties and behavior.

Must Know High School Pre-Calculus

by A. A. Abrikosov (Kindle Edition)

★★★★☆ 4.5 out of 5

Language	: English
File size	: 92091 KB
Text-to-Speech	: Enabled
Enhanced typesetting	: Enabled
Print length	: 464 pages
Screen Reader	: Supported

2. Algebraic Manipulations

Pre calculus requires a strong foundation in algebraic manipulations. This includes simplifying expressions, factoring polynomials, solving equations, and working with rational expressions. Mastery of these skills will greatly assist you in solving complex equations and inequalities in pre calculus.

3. Trigonometry

Trigonometry plays a significant role in pre calculus, as it involves the study of angles, triangles, and trigonometric functions like sine, cosine, and tangent. Understanding trigonometry is crucial for solving problems related to triangles,

vectors, and periodic functions, which frequently appear in pre calculus and other advanced math courses.

4. Exponents and Logarithms

Exponents and logarithms are important concepts in pre calculus that help establish connections between algebraic and exponential functions. Understanding these concepts is essential for solving exponential and logarithmic equations, as well as for manipulating expressions that involve exponents and logarithms.

5. Limits

Limits are fundamental to calculus and are introduced in pre calculus as a precursor to more advanced calculus concepts. Understanding limits involves determining the value a function approaches as the independent variable approaches a particular value. This concept is crucial for calculus and plays a vital role in understanding functions and their behavior.

6. Sequences and Series

Pre calculus involves studying sequences and series, which are ordered sets of numbers with specific patterns. These concepts are essential in understanding patterns, approximations, and convergence. Mastery of these concepts prepares students for the study of calculus and its applications in real-world scenarios.

7. Matrices and Determinants

Matrices and determinants form an important part of pre calculus and are widely used in various mathematical applications. Understanding matrices allows for efficient manipulation of data, solving systems of linear equations, and finding inverses. Determinants play a role in solving systems of equations and calculating areas/volumes.

8. Analytic Geometry

Analytic geometry combines algebra and geometry to study geometric shapes using algebraic techniques. Concepts such as distance, midpoint, slope, and equation of a line are fundamental in pre calculus and lay the foundation for more advanced topics in calculus. Mastery of this subject enhances problem-solving skills in mathematics.
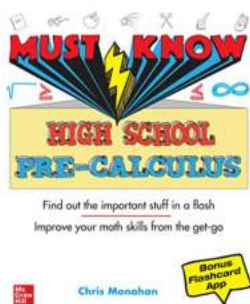
9. Vectors

Vectors are essential in pre calculus and provide a powerful mathematical tool for representing quantities that have both magnitude and direction. Understanding vector operations, such as addition, subtraction, scalar multiplication, and dot product, is crucial for solving problems related to forces, velocities, and various physical phenomena.

10. Application Problems

Pre calculus involves numerous application problems that require the application of various mathematical concepts to real-world scenarios. Developing problem-solving skills in pre calculus will equip you to tackle more complex and advanced math problems that you encounter in higher-level math courses, as well as in practical applications.

Mastering these ten high school pre calculus concepts is crucial for success in mathematics. The understanding of functions and graphs, algebraic manipulations, trigonometry, exponents and logarithms, limits, sequences and series, matrices and determinants, analytic geometry, vectors, and application problems will not only assist you in acing your pre calculus course but also provide a strong foundation for the study of calculus and other advanced math topics. Embrace these concepts, practice intensively, and enjoy the journey of exploring the wonderful world of mathematics!

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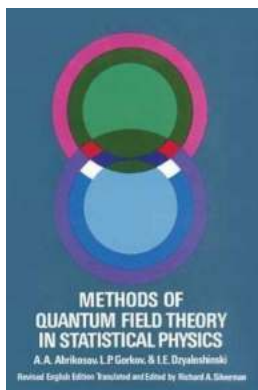|	
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The new Must Know series is like a lightning bolt to the brain

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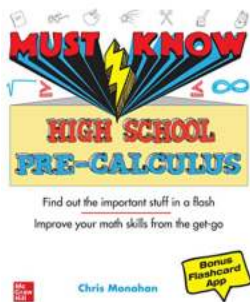
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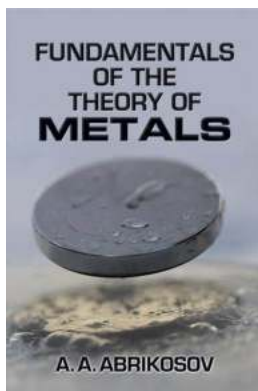
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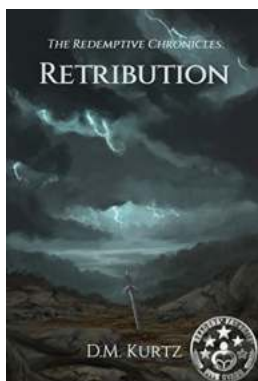
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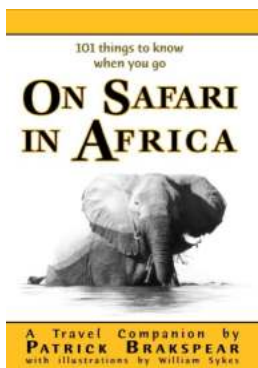
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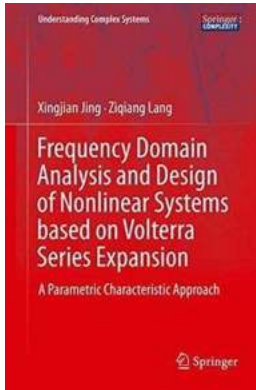
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