

Pre Calculus

Overview

Course Description: Pre-Calculus is a college preparatory curriculum that covers various topics such as relations, functions, and graphs; trigonometry, advanced functions (conics, sequences and series, exponential and logarithmic), and graphing; discrete mathematics (probability and statistics); and an introduction to calculus.

Course Rationale: This course serves as a prerequisite for Calculus and prepares students for college-level mathematics.

Grades: 11-12

Prerequisites: Geometry and Algebra II

Other: 2 Trimesters

Units of Study

<u>Unit Title</u>	<u>Length of Study</u>
Polynomials	5 to 6 weeks
Exponential and Logarithms	3 to 4 weeks
Trigonometry	10 to 12 weeks

Mathematics Core Units

Course Title: Pre Calculus

Unit Title: Polynomials

Length of Unit 5 to 6 weeks

Grade Level: 11 - 12

Unit 1 of 4

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>P3.1 Solve quadratic-type equations (e.g. $2x^2 - 4x + 4 = 0$) by substitution.</p> <p>P3.2 Apply quadratic functions and their graphs in the context of motion under gravity and simple optimization problems.</p> <p>P3.3 Explain how the parameters of an exponential or logarithmic model relate to the data set or situation being modeled. Find a quadratic function to model a given data set or situation.</p> <p>P4.1 Given a polynomial function whose roots are known or can be calculated, find the intervals on which the function's values are positive and those where it is negative.</p> <p>P4.2 Solve polynomial equations and inequalities of degree greater than or equal to three. Graph polynomial functions given in factored form using zeros and their multiplicities, testing the sign on intervals and analyzing the function's large-scale behavior.</p> <p>P4.3 Know and apply fundamental facts about polynomials: the Remainder Theorem, the Factor Theorem, and the Fundamental Theorem of Algebra.</p>	<p>I Can...</p> <p>...graph polynomials</p> <p>...I can calculate intercepts</p> <p>...create equations that models graphs and data tables</p> <p>...use synthetic division to help factor and solve</p>	<p>X intercept</p> <p>Y intercept</p> <p>Zeros</p> <p>Roots</p> <p>End Behavior</p> <p>Domain</p> <p>Range</p> <p>Max</p> <p>Min</p> <p>Complex Numbers</p>	<ol style="list-style-type: none"> Daily Homework Surveys Warm-Up (collected) Exit slips (Post lesson) Quizzes Tests Q & A discussions Writing prompts that have the students explain on how to solve specific problems, how to do a process, or how to apply knowledge to a different problem. 	<p>Technology</p> <ul style="list-style-type: none"> Activities with graphing calculator Overhead projector for notes <p>Print Material</p> <ul style="list-style-type: none"> Textbook Worksheets ACT Resource book Notes <p>Web Resources</p> <p>http://www.math.com/</p> <p>http://www.kutasoftware.com/freeia2.html</p> <p>http://www.actstudent.org/sampletest/math/math_01.html</p>

Mathematics Core Units

Course Title: Pre Calculus

Unit Title: Exponential and Logarithms

Length of Unit 3 to 4 weeks

Grade Level: 11- 12

Unit 2 of 4

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>P2.1 Use the inverse relationship between exponential and logarithmic functions to solve equations and problems.</p> <p>P2.2 Graph logarithmic functions. Graph translations and reflections of these functions.</p> <p>P2.3 Compare the large-scale behavior of exponential and logarithmic functions with different bases and recognize that different growth rates are visible in the graphs of the functions</p> <p>P2.4 Solve exponential and logarithmic equations when possible, (e.g. $5x=3(x+1)$). For those that cannot be solved analytically, use graphical methods to find approximate solutions.</p> <p>P2.5 Explain how the parameters of an exponential or logarithmic model relate to the data set or situation being modeled. Find an exponential or logarithmic function to model a given data set or situation. Solve problems involving exponential growth and decay.</p>	<p>I Can...</p> <p>...graph exponential and log functions</p> <p>...create equations to model exponential situations</p> <p>...use logarithms to solve for missing variables</p> <p>...use the property of logs and natural logs to solve compounded interest problems</p>	<p>Ratio</p> <p>Annual Change</p> <p>Half-life</p> <p>Decay</p> <p>Growth</p> <p>Compounded</p> <p>Logarithm</p> <p>Natural Logarithm</p> <p>Asymptote</p> <p>Domain</p> <p>Range</p>	<ol style="list-style-type: none"> Daily Homework Surveys Warm-Up (collected) Exit slips (Post lesson) Quizzes Tests Q & A discussions Writing prompts that have the students explain on how to solve specific problems, how to do a process, or how to apply knowledge to a different problem 	<p>Technology</p> <ul style="list-style-type: none"> Activities with graphing calculator Overhead projector for notes <p>Print Material</p> <ul style="list-style-type: none"> Textbook Worksheets ACT Resource book Notes <p>Web Resources</p> <p>http://www.math.com/</p> <p>http://www.kutasoftware.com/freeia2.html</p> <p>http://www.actstudent.org/sampletest/math/math_01.html</p>

Mathematics Core Units

Course Title: Pre Calculus

Unit Title: Trigonometry

Length of Unit 10 to 12 weeks

Grade Level: 11-12

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COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>P6.1 Define (using the unit circle), graph, and use all trigonometric functions of any angle. Convert between radian and degree measure. Calculate arc lengths in given circles.</p> <p>P6.2 Graph transformations of the sine and cosine functions (involving changes in amplitude, period, midline, and phase) and explain the relationship between constants in the formula and transformed graph.</p> <p>P6.3 Know basic properties of the inverse trigonometric functions $\sin^{-1} x$, $\cos^{-1} x$, $\tan^{-1} x$, including their domains and ranges. Recognize their graphs.</p> <p>P6.4 Know the basic trigonometric identities for sine, cosine, and tangent (e.g., the Pythagorean identities, sum and difference formulas, co-functions relationships, double-angle and half-angle formulas).</p> <p>P6.5 Solve trigonometric equations using basic identities and inverse trigonometric functions.</p> <p>P6.6 Prove trigonometric identities and derive some of the basic ones (e.g., double-angle formula from sum and difference formulas, half-angle formula from double-angle formula, etc.).</p> <p>P6.7 Find a sinusoidal function to model a given data set or situation and explain how the parameters of the model relate to the data set or situation.</p> <p>P5.1 Solve equations and inequalities involving rational functions. Graph rational functions given in factored form using zeros, identifying asymptotes, analyzing their behavior for large x values, and testing intervals.</p>	<p>I can...</p> <p>...create recursive and explicit formulas for arithmetic sequences</p> <p>...create recursive and explicit formulas for geometric sequences</p> <p>...find future terms of arithmetic and geometric sequences</p> <p>...calculate the finite sums of arithmetic and geometric sequences</p> <p>...calculate the infinite sum of a geometric series</p> <p>...use summation notation and perform operations</p>	<p>Ratio</p> <p>Difference</p> <p>Term</p> <p>Recursive</p> <p>Explicit</p> <p>Sequence</p> <p>Series</p> <p>Finite</p> <p>Infinite</p> <p>Summation</p> <p>Notation</p>	<ol style="list-style-type: none"> Daily Homework Surveys Warm-Up (collected) Exit slips (Post lesson) Quizzes Tests Q & A discussions Writing prompts that have the students explain on how to solve specific problems, how to do a process, or how to apply knowledge to a different problem 	<p>Technology</p> <ul style="list-style-type: none"> Activities with graphing calculator Overhead projector for notes <p>Print Material</p> <ul style="list-style-type: none"> Textbook Worksheets ACT Resource book Notes <p>Web Resources</p> <p>http://www.math.com/</p> <p>http://www.kutasoftware.com/freeia2.html</p> <p>http://www.actstudent.org/sampletest/math/math_01.html</p>

P5.2 Given vertical and horizontal asymptotes, find an expression for a rational function with these features.

P5.3 Know and apply the definition and geometric interpretation of difference quotient. Simplify difference quotients and interpret difference quotients as rates of change and slopes of secant lines.