SC Standards: Math Pre Calculus

Unit: Algebraic Review

Math-PC-1.1 Communicate knowledge of algebraic and trigonometric relationships by using mathematical terminology appropriately.

Math-PC-3.6 Carry out a procedure to solve polynomial equations algebraically.

Math-PC-3.7 Carry out a procedure to solve polynomial equations graphically.

Math-PC-3.10 Carry out a procedure to solve polynomial inequalities algebraically.

Math-PC-3.11 Carry out a procedure to solve polynomial inequalities graphically.

Math-PC-4.5 Apply the laws of exponents to solve problems involving rational exponents.

Unit: Introduction to Functions

Math-PC-2.2 Carry out a procedure to graph transformations (including -f(x), a • f(x), f(x) + d, f(x - c), f(-x), f(b • x), |f(x)|, and f(|x|)) of parent functions and combinations of transformations.

Math-PC-2.3 Analyze a graph to describe the transformation (including -f(x), a • f(x), f(x) + d, f(x - c), f(-x), f(b • x), |f(x)|, and f(|x|)) of parent functions.

Math-PC-2.5 Analyze graphs, tables, and equations to determine the domain and range of parent functions or transformations of parent functions (including y = xn, y = $\log_a x$, y = ln x, y = , y = ex, y = ax, y = sin x, y = cos x, y = tan x, y = csc x, y = sec x, and y = cot x

Math-PC-2.6 Analyze a function or the symmetry of its graph to determine whether the function is even, odd, or neither.

Math-PC-2.7 Recognize and use connections among significant points of a function (including roots, maximum points, and minimum points), the graph of a function, and the algebraic representation of a function.

Unit : Operations on Functions

Math-PC-2.1 Carry out a procedure to graph parent functions (including y = x^n , y = $\log_a x$, y = ln x, y = $\frac{1}{x}$, y = e^x , y =a ^{x} , y = sin x, y = cos x, y = tan x, y = csc x, y = sec x, and y = cot x).

Math-PC-2.2 Carry out a procedure to graph transformations (including -f(x), a • f(x), f(x) + d, f(x - c), f(-x), f(b • x), |f(x)|,and f(|x|)) of parent functions and combinations of transformations.

Math-PC-2.3 Analyze a graph to describe the transformation (including -f(x), a • f(x), f(x) + d, f(x - c), f(-x), f(b • x), |f(x)|, and f(|x|)) of parent functions.

Math-PC-2.4 Carry out procedures to algebraically solve equations involving parent functions or transformations of parent functions (including y = x^n, y = $\log_a x$ y = ln x, y = $\frac{1}{x}$, y = e^x, y = a^x, y = sin x, y = cos x, y = tan x, y= csc x, y = sec x, and y = cot x).

Math-PC-2.5 Analyze graphs, tables, and equations to determine the domain and range of parent functions or transformations of parent functions (including y = x^n, y = $\log_a x$ y = ln x, y = $\frac{1}{x}$, y = e^x, y = a^x, y = sin x, y = cos x, y = tan x, y = csc x, y = sec x, and y = cot x.)

Math-PC-2.8 Carry out a procedure to determine whether the inverse of a function exists.

Math-PC-2.9 Carry out a procedure to write a rule for the inverse of a function, if it exists.

Unit: Polynomial Functions and Their Zeros

Math-PC-1.2 Connect algebra and trigonometry with other branches of mathematics.

Math-PC-1.4 Judge the reasonableness of mathematical solutions.

Math-PC-1.7 Understand how to represent algebraic and trigonometric relationships by using tools such as handheld computing devices, spreadsheets, and computer algebra systems (CASs).

Math-PC-3.1 Carry out a procedure to graph quadratic and higher-order polynomial functions by analyzing intercepts and end behavior.

Math-PC-3.10 Carry out a procedure to solve polynomial inequalities algebraically.

Math-PC-3.11 Carry out a procedure to solve polynomial inequalities graphically.

Math-PC-3.2 Apply the rational root theorem to determine a set of possible rational roots of a polynomial equation.

Math-PC-3.3 Carry out a procedure to calculate the zeros of polynomial functions when given a set of possible zeros.

Math-PC-3.5 Analyze given information to write a polynomial function that models a given problem situation.

Math-PC-3.6 Carry out a procedure to solve polynomial equations algebraically.

Math-PC-3.7 Carry out a procedure to solve polynomial equations graphically.

Unit: Solving and Graphing Rational Functions

Math-PC-1.5 Demonstrate an understanding of algebraic and trigonometric relationships by using a variety of representations (including verbal, graphic, numerical, and symbolic).

Math-PC-3.4 Carry out procedures to determine characteristics of rational functions (including domain, range, intercepts, asymptotes, and discontinuities).

Math-PC-3.8 Carry out a procedure to solve rational equations algebraically.

Math-PC-3.9 Carry out a procedure to solve rational equations graphically.

Unit: Exponential and Logarithmic Functions

Math-PC-4.1 Carry out a procedure to graph exponential functions by analyzing intercepts and end behavior.

Math-PC-4.10 Carry out a procedure to solve logarithmic equations algebraically.

Math-PC-4.11 Carry out a procedure to solve logarithmic equations graphically.

Math-PC-4.2 Carry out a procedure to graph logarithmic functions by analyzing intercepts and end behavior.

Math-PC-4.3 Carry out procedures to determine characteristics of exponential functions (including domain, range, intercepts, and asymptotes).

Math-PC-4.4 Carry out procedures to determine characteristics of logarithmic functions (including domain, range, intercepts, and asymptotes).

Math-PC-4.6 Analyze given information to write an exponential function that models a given problem situation.

Math-PC-4.7 Apply the laws of logarithms to solve problems.

Math-PC-4.8 Carry out a procedure to solve exponential equations algebraically.

Math-PC-4.9 Carry out a procedure to solve exponential equations graphically.

Unit: Conic Sections

Math-PC-6.1 Carry out a procedure to graph the circle whose equation is the form $(x-h)^2+(y-k)^2=r^2$.

Math-PC-6.2 Analyze given information about the center and the radius or the center and the diameter to write an equation of a circle.

Math-PC-6.3 Apply a procedure to calculate the coordinates of points where a line intersects a circle.

Math-PC-6.4 Carry out a procedure to graph the ellipse whose equation is the form $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$.

Math-PC-6.5 Carry out a procedure to graph the hyperbola whose equation is the form $\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$.

Math-PC-6.6 Carry out a procedure to graph the parabola whose equation is the form $y-k=a(x-h)^2$.

Unit: Sequences and Series (Additional topic as time allows)

Math-IA-6.1 Categorize a sequence as arithmetic, geometric, or neither.

Math-IA-6.2 Carry out a procedure to write a specified term of an arithmetic or geometric sequence when given the nth term of the sequence.

Math-IA-6.3 Carry out a procedure to write a formula for the nth term of an arithmetic or geometric sequence when given at least four consecutive terms of the sequence.

Math-IA-6.4 Carry out a procedure to write a formula for the nth term of an arithmetic or geometric sequence when given at least four terms of the sequence.

Math-IA-6.5 Represent an arithmetic or geometric series by using sigma notation.

Math-IA-6.6 Carry out a procedure to calculate the sum of an arithmetic or geometric series written in sigma notation.

Math-IA-6.7 Carry out a procedure to determine consecutive terms of a sequence that is defined recursively.

Math-IA-6.8 Carry out a procedure to define a sequence recursively when given four or more consecutive terms of the sequence.

Math-IA-6.9 Translate between the explicit form and the recursive form of sequences.

Unit: Introduction to Trig

Math-PC-1.2 Connect algebra and trigonometry with other branches of mathematics.

Math-PC-1.3 Apply algebraic methods to solve problems in real-world contexts.

Math-PC-1.6 Understand how algebraic and trigonometric relationships can be represented in concrete models, pictorial models, and diagrams.

Math-PC-5.1 Understand how angles are measured in either degrees or radians.

Math-PC-5.15 Carry out a procedure to compute the slope of a line when given the angle of inclination of the line.

Math-PC-5.2 Carry out a procedure to convert between degree and radian measures.

Math-PC-5.6 Apply a procedure to evaluate trigonometric expressions.

Math-PC-5.8 Analyze given information to write a trigonometric equation that models a given problem situation involving right triangles.

Unit: Graphing Trig Functions

Math-PC-5.13 Apply a procedure to graph the inverse functions of sine, cosine, and tangent.

Math-PC-5.4 Carry out a procedure to graph trigonometric functions by analyzing intercepts, periodic behavior, and graphs of reciprocal functions.

Math-PC-5.5 Carry out procedures to determine the characteristics of trigonometric functions (including domain, range, intercepts, and asymptotes).

Math-PC-5.7 Analyze given information to write a trigonometric function that models a given problem situation involving periodic phenomena.

Unit: Trig Identities

Math-PC-5.14 Apply trigonometric relationships (including reciprocal identities; Pythagorean identities; even and odd identities; addition and subtraction formulas of sine, cosine, and tangent; and double angle formulas) to verify other trigonometric identities

Unit: Trigonometric Equations

Math-PC-1.5 Demonstrate an understanding of algebraic and trigonometric relationships by using a variety of representations (including verbal, graphic, numerical, and symbolic).

Math-PC-5.10 Carry out a procedure to solve trigonometric equations algebraically.

Math-PC-5.11 Carry out a procedure to solve trigonometric equations graphically.

Math-PC-5.14 Apply trigonometric relationships (including reciprocal identities; Pythagorean identities; even and odd identities; addition and subtraction formulas of sine, cosine, and tangent; and double angle formulas) to verify other trigonometric identities.

Unit: Law of Sines and Cosines

Math-PC-5.12 Apply the laws of sines and cosines to solve problems.

Math-PC-5.9 Carry out a procedure to calculate the area of a triangle when given the lengths of two sides and the measure of the included angle.

Unit: Polar Coordinates

Math-PC-5.3 Carry out a procedure to plot points in the polar coordinate system.

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