Wyoming Department of Education Required Virtual Education Course Syllabus

Sheridan County School District # 1

Program Name	Sheridan County School District #1 Virtual School	Content Area	MA
Course ID	AC02103	Grade Level	11 - 12
Course Name	Trigonometry	# of Credits	1
SCED Code	02103	Curriculum Type	Acellus

COURSE DESCRIPTION

In Acellus Trigonometry, students learn about the relationships between the sides and the angles of triangles and how to make calculations based on them using trigonometric functions. Acellus Trigonometry is A-G Approved through the University of California.

STANDARD #	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
N.CN.1	Know there is a complex number i such that i^2 = −1, and every complex number has the form a + bi with a and b real.
N.VM.1	(+)Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v(bold), |v|, ||v||, v(not bold)).
F.IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*
F.IF.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
F.BF.3	Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
F.BF.4	Find inverse functions.
F.TF.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
F.TF.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
F.TF.3	(+)Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π - x, π + x, and 2π - x in terms of their values for x, where x is any real number.
F.TF.4	(+)Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

F.TF.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*
F.TF.6	(+)Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
F.TF.7	(+)Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.*
F.TF.8	Prove the Pythagorean identity (sin A)^2 + (cos A)^2 = 1 and use it to find sin A, cos A, or tan A, given sin A, cos A, or tan A, and the quadrant of the angle.
F.TF.9	(+)Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.
G.SRT.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
G.SRT.7	Explain and use the relationship between the sine and cosine of complementary angles.
G.SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G.SRT.10	(+)Prove the Laws of Sines and Cosines and use them to solve problems.
G.SRT.11	(+)Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).
G.C.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1 – Preliminaries	G.SRT.6	In this unit students learn about similarity and proportion, and 30-60-90 and 45-45-90 right triangles. They also learn about rationalizing the denominator, degrees, minutes, and seconds.
Unit 2 – Right Triangle Trigonometry	F.TF.8, G.SRT.6, G.SRT.8	In this unit students learn about sine, cosine and tangent, and word problems for each. They also learn about pythagorean and tangent identities.
Unit 3 – Circles	F.TF.1, F.TF.2, G.C.5	In this unit students learn about radians and special angles, arc length, and sector area. They also learn about extended angles – coterminal, unit circle, and new definitions.
Unit 4 – Additional Functions	F.BF.4, F.TF.6	In this unit students study additional functions. They learn about reciprocal and inverse functions.

Unit 5 – Solving Non-Right Triangles	G.SRT.10, G.SRT.11	In this unit students study solving non-right triangles. They learn about areas of triangles and the laws of sines and cosines.
Unit 6 – Vectors	N.CN.1, N.VM.1	In this unit students learn about magnitude and directions, and horizontal and vertical components. They also learn about adding vectors geometrically and algebraically, and compass headings.
Unit 7 – Powers, Roots, and Complex Numbers	F.IF.4, F.IF.7, F.BF.3, F.TF.3, F.TF.4	In this unit students learn about graphs of sine, cosine, tangent, secant, cosecant, and cotangent. They also learn about amplitude, period, horizontal and vertical translations, and a review of graphing concepts.
Unit 8 – Identities	G.SRT.7	In this students review identities and learn about cofunction and negative angle identities. They also learn about simplifying expressions.
Unit 9 – Solving Trigonometric Equations		In this unit students study solving trigonometric equations. They learn about combining like terms, square roots, factoring, and quadratics.
Unit 10 – More Identities	F.IF.8, F.TF.9	In this unit students learn about sum and difference formulas for sine, cosine, and tangent. They also learn about double-angle formulas and half-angle formulas.
Unit 11 – Problem Solving	F.TF.5, F.TF.7	In this unit students study problem solving. In particular, they learn about problem solving in trigonometry.