GRADE LEVEL: HIGH SCHOOL **SUBJECT: TRIGONOMETRY** **DATE: 2021 - 2022**

GRADING PERIOD: QUARTER 3 **MASTER COPY revised 5/21/21**

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
UNIT CIRCLE					
• RADIANS • UNIT CIRCLE	**TR.UC.1:** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	• Understand the relationship between radian measure and arc length on the unit circle.	• Class discussion • Quiz/Test	• Radians • Arc length • Unit circle	Critical
• TRIGONOMETRIC FUNCTIONS ON THE UNIT CIRCLE	**TR.UC.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.	• Describe how to use the unit circle to evaluate trigonometric function as a real number. • Use radian measure on the unit circle.	• Student presentation • Teacher observation • Quiz/Test	• Trigonometry • Sine • Cosine • Tangent	Critical
• SPECIAL RIGHT TRIANGLES	**TR.UC.3:** Use special triangles to determine the values of sine, cosine, and tangent for $\pi/3$, $\pi/4$, and $\pi/6$. Apply special right triangles to the unit circle and use them to express the values of sine, cosine, and tangent for x, $\pi \pm x$, and $2\pi \pm x$ in terms of their values for x, where x is any real number.	• Determine the values of sine, cosine, and tangent for $\pi/3$ and $\pi/6$, using $30^o - 60^o - 90^o$ triangles; and $\pi/4$ using $45^o - 45^o - 90^o$ triangles. • Apply special right triangles to the unit circle to evaluate sine, cosine, and tangent of angles that are co-terminal to $\pi/3$, $\pi/4$, and $\pi/6$.	• Class discussion • Teacher observation • Quiz/Test	• Special right triangles • Co-terminal angles	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
TRIANGLES					
• TRIGONOMETRIC RATIOS IN RIGHT TRIANGLES • TRIGONOMETRIC RATIOS ON THE UNIT CIRCLE	**TR.T.1:** Define and use the trigonometric ratios (sine, cosine, tangent, cotangent, secant, cosecant) in terms of angles of right triangles and the coordinates on the unit circle.	• Define and use the trigonometric ratios in a right triangles. • Define and use the trigonometric ratios on the unit circle.	• Class discussion • Teacher observation • Quiz/Test		Critical
• REAL-WORLD PROBLEMS • USING TRIGONOMETRIC RATIOS	**TR.T.2:** Solve real-world problems with and without technology that can be modeled using right triangles, including problems that can be modeled using trigonometric ratios. Interpret the solutions and determine whether the solutions are reasonable.	• Use trigonometric ratios to solve real-world problems using right triangles. • Interpret solutions and determine whether the solutions are reasonable.	• Class discussion • Teacher observation • Quiz/Test	• Trigonometric ratios	Important
• SINE AND COSINE OF COMPLEMENTARY ANGLES	**TR.T.3:** Explain and use the relationship between the sine and cosine of complementary angles.	• Describe and apply the relationship between the sine and cosine of complementary angles.	• Teacher observation • Quiz/Test	• Complementary angles	Important
• LAW OF SINES • LAW OF COSINES	**TR.T.4:** Prove the Laws of Sines and Cosines.	• Prove Law of Sines and Law of Cosines.	• Teacher observation • Quiz/Test	• Law of Sines • Law of Cosines	Critical
• REAL –WORLD PROBLEMS	**TR.T.5:** Understand and apply the Laws of Sines and Cosines to solve real-world and other mathematical problems involving right and non-right triangles.	• Use the law of sines and law of cosines to solve problems involving triangle. • Use the law of sines and the law of cosines to solve real-world problems.	• Class discussion • Teacher observation • Quiz/Test		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
TRIANGLES					
• AREA OF A TRIANGLE	**TR.T.6:** Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line. Use the formula to find areas of triangles.	• Derive the formula A=1/2 ab sinC. • Use the area form to find areas of triangles.	• Student presentation • Quiz/Test	• Auxiliary line	Important
PERIODIC FUNCTIONS					
• GRAPHS OF TRIGONOMETRIC FUCNTIONS	**TR.PF.1:** Graph trigonometric functions with and without technology. Use the graphs to model and analyze periodic phenomena, stating amplitude, period, frequency, phase shift, and midline (vertical shift).	• Graph trigonometric functions. • Use graphs to model and analyze periodic phenomena, amplitude, period, frequency, phase shift, and vertical shift.	• Teacher observation • Quiz/Test	• Period • Amplitude • Phase shift • Frequency • Vertical shift	Critical
• SINUSOIDAL FUNCTIONS	**TR.PF.2:** Model a data set with periodicity using a sinusoidal function and explain the parameters of the model.	• Find a sinusoidal function to model a set of data.	• Student presentation • Quiz/Test	• Sinusoidal function	Critical
• SYMMETRY AND PERIODICITY OF TRIGONOMETRIC FUNCTIONS	**TR.PF.3:** Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	• Explain symmetry and periodicity of trigonometric functions on the unit circle.	• Student presentation • Class discussion • Quiz/Test	• Symmetry • periodicity	Critical
• INVERSE TRIGONOMETRIC FUNCTIONS	**TR.PF.4:** Construct the inverse trigonometric functions of sine, cosine, and tangent by restricting the domain.	• Derive and graph the inverse trigonometric function of sine, cosine, and tangent by restricting the domain.	• Teacher observation • Class discussion • Quiz/Test	• Inverse trigonometric function	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
PERIODIC FUNCTIONS					
• TRIGONOMETRIC EQUATIONS	**TR.PF.5:** 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.	• Solve trigonometric equations using inverse functions. • Evaluate and interpret solutions using technology.	• Teacher observation • Class discussion • Quiz/Test		Critical
IDENTITIES					
• PYTHAGOREAN IDENTITIES	**TR.ID.1:** Prove the Pythagorean identity $\sin^2(x) + \cos^2(x) = 1$ and use it to find trigonometric ratios, given sin(x), cos(x), or tan(x), and the quadrant of the angle.	• Prove the Pythagorean identity. • Solve problems using the Pythagorean identity.	• Teacher observation • Class discussion • Quiz/Test	• Pythagorean identity	Critical
• TRIGONOMETRIC IDENTITIES	**TR.ID.2:** Verify trigonometric identities and simplify expressions using trigonometric identities.	• Verify trigonometric identities. • Simplify expressions using trigonometric identities.	• Class discussion • Quiz/Test		Critical
• TRIGONOMETRIC ADDITION AND SUBTRACTION FORMULAS	**TR.ID.3:** Prove the addition and subtraction identities for sine, cosine, and tangent. Use the identities to solve problems.	• Prove the sine, cosine, and tangent addition and subtraction formulas. • Apply the sine, cosine, and tangent addition and subtraction formulas to solve problems.	• Class discussion • Quiz/Test		Critical
• DOUBLE ANGLE FORMULAS • HALF ANGLE FORMULAS	**TR.ID.4:** Prove the double- and half-angle identities for sine, cosine, and tangent. Use the identities to solve problems.	• Prove the double and half angle formulas for sine, cosine, and tangent. • Solve problems using the double and half angle formulas.	• Class discussion • Quiz/Test		Critical

GRADE LEVEL: HIGH SCHOOL **SUBJECT: TRIGONOMETRY** **DATE: 2020 - 2021**

GRADING PERIOD: QUARTER 4 **MASTER COPY revised 5/21/2021**

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
POLAR COORDINATES AND COMPLEX NUMBERS					
• RECTANGULAR • POLAR	**TR.PC.1:** Understand and use complex numbers, including real and imaginary numbers, on the complex plane in rectangular and polar form, and explain why the rectangular and polar forms of a given complex number represent the same number.	• Represent complex numbers in both rectangular and polar form. • Explain why the rectangular and polar form of a complex number represent the same number.	• Class discussion • Quiz/Test	• Polar • Rectangular	Important
• DEMOIVRE'S THEOREM	**TR.PC.2:** State, prove, and use DeMoivre's Theorem.	• State DeMoivre's Theorem. • Prove DeMoivre's Theorem.	• Class discussion • Quiz/Test	• DeMoivree's Theorem	Critical
• POLAR COORDINATES • CARTESIAN COORDINATES	**TR.PC.3:** Define polar coordinates and relate polar coordinates to Cartesian coordinates.	• Define polar coordinates. • Compare polar coordinate and Cartesian coordinates.	• Class discussion • Test/Quiz	• Polar Coordinates • Cartesian Coordinates	Critical
• RECTANGULAR COORDINATES	**TR.PC.4:** Translate equations from rectangular coordinates to polar coordinates and from polar coordinates to rectangular coordinates. Graph equations in the polar coordinate plane.	• Change from rectangular to polar coordinates. • Change from polar to rectangular coordinates. • Graph equations in the polar coordinate plane.	• Teacher observation • Test/Quiz	• Rectangular coordinates	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
VECTORS					
• MAGNITUDE • DIRECTION	**TR.V.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., $\boldsymbol{v}$, $\lvert\boldsymbol{v}\rvert$, $\lvert\lvert\boldsymbol{v}\rvert\rvert$).	• Know that vectors are always represented with two quantities, magnitude and direction. • Represent vector quantities with directed line segments. • Use the correct symbols to identify vectors and their magnitudes.	• Student work • Teach observation • Test/Quiz	• Magnitude • Direction	Critical
• COMPNENT FORM	**TR.V.2:** Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	• Find the components of a vector by the subtraction method.	• Student work • Teacher observation • Test/Quiz	• Component form • Initial point • Terminal point	Critical
• ADD VECTORS	**TR.V.3:** Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.	• Add vectors using physical models (arrows). • Add vectors in component form. • Understand the magnitude of the sum of two vectors is not usually the sum of the two magnitudes because of the direction.	• Student work • Teacher observation • Test/Quiz	• Vector addition • Parallelogram method	Critical
• SUBTRACT VECTORS	**TR.V.4:** Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of $\boldsymbol{w}$, with the same magnitude as $\boldsymbol{w}$ and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.	• Subtract vectors using physical models (arrows). • Subtract vectors in component form. • Understand that negating a vector (multiplying is by a negative number), means the vector will have an opposite direction.	• Student work • Teacher observation • Test/Quiz	• Vector subtraction	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
VECTORS					
• SCALAR MULTIPLICATION	**TR.V.5:** Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(**v**x, **v**y) = (c**v**x, c**v**y).	• Represent scalar multiplication graphically. • Represent multiplication component-wise.	• Class discussion • Test/Quiz	• Scalar multiplication • Component Form	Important
• MAGNITUDE • DIRECTION	**TR.V.6:** Compute the magnitude of a scalar multiple c**v** using $\|\|c\mathbf{v}\|\| = \|c\|\mathbf{v}$. Compute the direction of c**v** knowing that when $\|c\|\mathbf{v} \neq 0$, the direction of c**v** is either along **v** (for $c > 0$) or against **v** (for $c < 0$).	• Compute the magnitude of a scalar multiple vector. • Determine the direction of a scalar multiple vector.	• Teacher observation • Test/Quiz	• Magnitude • Direction	Critical
• VELOCITY	**TR.V.7:** Solve problems involving velocity and other quantities that can be represented by vectors.	• Solve problems that involve velocity and other quantities that can be represented by vectors.	• Teacher observation • Test/Quiz	• Velocity	Critical