WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Honors Pre-Calculus
Course Number: 00271
Course Prerequisites: Recommended grade average of 80% of higher in Honors Algebra II and Honors Geometry.

Course Description: Pre-Calculus Honors is an academic course designed primarily for students who plan to enter college and pursue a program of studies in mathematics or a mathematically related field such as engineering, accounting, or pre-medicine. We will study functions and graphs (linear, quadratic, polynomial, rational, exponential, logarithmic, and trigonometric), analytic trigonometry, and analytic geometry. It is strongly recommended that students planning to enroll in Calculus are first exposed to the rigors of Pre-Calculus. After successful completion of this course, it is recommended that students take Calculus or Advanced Placement Calculus.

Suggested Grade Level: Grades 11-12
Length of Course: Two Semesters
Units of Credit: 1
PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:
Mathematics #50
To find the CSPG information, go to CSPG
Certification verified by the WCSD Human Resources Department: ☒Yes ☐No

WCSD STUDENT DATA SYSTEM INFORMATION

Course Level: Honors & Dual Enrollment (1) GPA +5%
Mark Types: Check all that apply.
☒F – Final Average ☒MP – Marking Period ☒EXM – Final Exam

GPA Type: ☐ GPAEL-GPA Elementary ☐ GPAML-GPA for Middle Level ☒ NHS-National Honor Society
☒ UGPA-Non-Weighted Grade Point Average ☒ GPA-Weighted Grade Point Average

State Course Code: 02110
To find the State Course Code, go to State Course Code, download the Excel file for *SCED*, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:

Title:	Pre-Calculus with Limits: A Graphing Approach
ISBN #:	978-1-337-90428-5
Copyright Date:	2020
WCSD Board Approval Date:	6/29/2020

Supplemental Materials: Click or tap here to enter text.

Curriculum Document

WCSD Board Approval:

Date Finalized:	6/5/2020
Date Approved:	6/29/2020
Implementation Year:	2020-2021

SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

SCOPE AND SEQUENCE OF CONTENT, CONCEPTS, AND SKILLS

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Month Taught and Assessed for Mastery**
Apply basic rules and properties of Algebra.	2.1, 2.2	August September
Apply properties of exponents and radicals.	2.1, 2.2	August September
Factor polynomials.	2.1, 2.2	August September
Simplify Rational Expressions and Functions.	2.1, 2.2	August September
Solve linear equations.	2.2	August September
Solve multi-step linear inequalities.	2.2	August September
Solve quadratic equations	2.2	August September
Find the slopes of lines.	2.2	September October
Write linear equations given points on lines and their slopes.	2.2	September October
Use slope intercept form of linear functions to sketch lines.	2.2	September October
Use slopes to identify parallel and perpendicular lines.	2.2	September October
Determine if a relation between two variables represents a function.	2.2	September October
Use function notation and evaluate functions.	2.2	September October
Find the domain of functions.	2.2	September October
Use functions to model and solve real like problems.	2.2	September October
Evaluate difference quotients.	2.2	September October
Find the domain and range of functions and use the vertical line test for functions.	2.2	September October
Determine intervals on which functions are increasing, decreasing, or constant.	2.2	September October
Determine relative minimums and relative maximums of functions.	2.2	September October
Identify and graph step functions and other piece-wise defined functions.	2.2	September October
Identify even and odd functions.	2.2	September October
Recognize graphs of parent functions.	2.2	September October
Use vertical and horizontal shifts to sketch graphs of functions.	2.2	September October
Use reflections to sketch graphs of functions.	2.2	September October

Use non-rigid transformations to sketch graphs of functions.	2.2	September October
Add, subtract, multiply, and divide functions.	2.2	September October
Find compositions of one function with another function.	2.2	September October
Use combinations of functions to model and solve real life problems.	2.2	September October
Find inverse functions informally and verify that two functions are inverse functions of each other.	2.2	September October
Use graphs of functions to determine if functions have inverse functions.	2.2	September October
Determine if functions are one to one.	2.2	September October
Find inverse functions algebraically.	2.2	September October
Construct scatterplots and interpret correlation.	2.2	September October
Use scatterplots in a graphing utility to find linear models for data.	2.2	September October
Analyze graphs of quadratics functions.	2.2	October November
Write quadratic functions in standard form and use the results to sketch graphs of functions.	2.2	October November
Find minimum and maximum values of quadratics functions in real life situations.	2.2	October November
Use transformations to sketch graphs of polynomial functions.	2.2	October November
Use the leading coefficient test to graph the end behavior of polynomial functions.	2.2	October November
Find and use zeros of polynomial functions as sketching aides.	2.2	October November
Use the intermediate value theorem to help locate zeros of polynomial functions.	2.2	October November
Use long division to divide polynomials by other polynomials.	2.2	October November
Use synthetic division to divide polynomials by binomials.	2.2	October November
Use the remainder and factor theorems.	2.2	October November
Use the rational zero test to determine possible rational zeros of polynomials functions	2.2	October November
Use Descartes' Rules of signs and the upper and lower bounds to find real zeros of polynomials.	2.2	October November
Use the imaginary unit i to write complex numbers.	2.2	October November
Add, subtract, multiply, and divide complex numbers.	2.2	October November
Use complex conjugates to write the quotient of two complex numbers in standard form.	2.2	October November
Find complex solutions of quadratic equations.	2.2	October November
Use the fundamental theorem of algebra to determine the number of zeros of a polynomial function.	2.2	October November

Find all zeros of polynomial functions.	2.2	October November
Find conjugate pairs of complex zeros.	2.2	October November
Find zeros of polynomials by factoring.	2.2	October November
Find the domains of rational functions.	2.2	October November
Find vertical and horizontal asymptotes of rational functions.	2.2	October November
Use rational functions to model and solve real life problems.	2.2	October November
Analyze and sketch graphs of rational functions.	2.2	October November
Sketch graphs of rational functions that have slant asymptotes.	2.2	October November
Use graphs of rational functions to model and solve real life problems.	2.2	October November
Classify scatter plots.	2.2	October November
Use scatter plots and a graphing utility to find quadratic models for data.	2.2	October November
Choose a model that best fits a set of data.	2.2	October November
Recognize and evaluate exponential functions with base a.	2.2	December January
Graph exponential functions with base a.	2.2	December January
Recognize and evaluate and graph exponential functions with base e.	2.2	December January
Use exponential functions to model and solve real life problems.	2.2	December January
Recognize and evaluate logarithmic functions with base a.	2.2	December January
Graph logarithmic functions with base a.	2.2	December January
Recognize, evaluate, and graph natural logarithmic functions.	2.2	December January
Use logarithmic functions to model and sole real life problems.	2.2	December January
Rewrite logarithms with different bases.	2.2	December January
Use properties of logarithms to evaluate or rewrite logarithmic expressions.	2.2	December January
Use properties of logarithms to expand or condense logarithmic expressions.	2.2	December January
Use logarithmic functions to model and solve real life problems.	2.2	December January
Solve simple exponential and logarithmic equations.	2.2	December January
Solve more complicated exponential equations.	2.2	December January
Solve more complicated logarithmic equations.	2.2	December January
Use exponential and logarithmic equations to model and solve real life problems.	2.2	December January

Recognize the five most common types of models involving exponential or logarithmic functions.	2.2	December January
Use exponential growth and decay functions to model and solve real life problems.	2.2	December January
Use Gaussian functions to solve and model real life problems.	2.2	December January
Use logistic growth functions to model and solve real life problems.	2.2	December January
Use logarithmic functions to model and solve real life problems.	2.2	December January
Classify scatterplots.	2.2	December January
Use scatterplots and a graph utility to find models for data and determine the model that best fits a set of data.	2.2	December January
Use a graphing utility to find exponential and logistic models for data.	2.2	December January
Describe angles.	2.3	January February
Use radian measure.	2.2	January February
Use degree measure and convert between degrees and radians.	2.2	January February
Use angles to model and solve real life problems.	2.3	January February
Identify the unit circle and describe its relationship to real numbers.	2.2	January February
Evaluate trigonometric functions using the unit circle.	2.2	January February
Use domain and period to evaluate sine and cosine functions.	2.2	January February
Use a calculator to evaluate trigonometric functions.	2.2	January February
Evaluate trigonometric functions of acute angles.	2.2	January February
Use fundamental trigonometric identities.	2.2	January February
Use trigonometric identities to solve and model real life problems.	2.2	January February
Evaluate trigonometric functions of any angle.	2.2	January February
Find reference angles.	2.2	January February
Evaluate trigonometric functions of real numbers.	2.2	January February
Sketch the graphs of basic sine and cosine functions.	2.2	January February
Use amplitude and period to sketch the graphs of sine and cosine functions.	2.2	January February
Sketch translations of graphs of sine and cosine functions.	2.2	January February
Use sine and cosine functions to model real life data.	2.2	January February
Sketch the graph of tangent functions.	2.2	January February

Sketch the graph of cotangent functions.	2.2	January February
Sketch the graph of secant and cosecant functions.	2.2	January February
Evaluate and graph inverse sine functions.	2.2	January February
Evaluate and graph other inverse functions.	2.2	January February
Evaluate composition of trigonometric functions.	2.2	January February
Solve real life problems involving right triangles.	2.2, 2.3	January February
Solve real life problems involving directional bearings.	2.2	January February
Solve real life problems involving harmonic motion.	2.2	January February
Recognize and write the fundamental trigonometric identities.	2.2	February March
Use the fundamental trigonometric identities to evaluate trigonometric functions, simplify trigonometric expressions, and rewrite trigonometric expressions.	2.2	February March
Verify trigonometric identities.	2.2	February March
Use standard algebraic techniques to solve trigonometric equations.	2.2	February March
Solve trigonometric equations of quadratic type.	2.2	February March
Solve trigonometric equations involving multiple angles.	2.2	February March
Use inverse trigonometric functions to solve trigonometric equations.	2.2	February March
Use sum and difference formulas to evaluate trigonometric functions, verify trigonometric identities, and solve trigonometric equations.	2.2	February March
Use multiple-angle formulas to rewrite and evaluate trigonometric functions.	2.2	February March
Use power-reducing formulas to rewrite and evaluate trigonometric functions.	2.2	February March
Use half-angle formulas to rewrite and evaluate trigonometric functions.	2.2	February March
Use product-to-sum and sum-to-product formulas to rewrite and evaluate trigonometric functions.	2.2	February March
Use the Law of Sines to solve oblique triangles.	2.2	March April
Find areas of oblique triangles and use the Law of Sines to model and solve real-life problems.	2.2	March April
Use the Law of Cosines to solve oblique triangles.	2.2	March April
Use the Law of Cosines to model and solve real-life problems.	2.2	March April
Use Heron's Area Formula to find areas of triangles.	2.2	March April

THE FOLLOWING ARE OPTIONAL PERFORMANCE INDICATORS.		
Use the methods of substitution and graphing to solve systems of equations in two variables.	2.2	April May
Use systems of equations to model and solve real-life problems.	2.2	April May
Use the method of elimination to solve systems of linear equations in two variables.	2.2	April May
Graphically interpret the number of solutions of a system of linear equations in two variables.	2.2	April May
Use systems of linear equations in two variables to model and solve real-life problems.	2.2	April May
Use back-substitution to solve linear systems in row-echelon form.	2.2	April May
Use Gaussian elimination to solve systems of linear equations.	2.2	April May
Solve non square systems of linear equations.	2.2	April May
Graphically interpret three-variable linear systems.	2.2	April May
Use systems of linear equations to write partial fraction decompositions of rational expressions.	2.2	April May
Use systems of linear equations in three or more variables to model and solve real-life problems.	2.2	April May
Write matrices and determine their dimensions.	2.2	April May
Perform elementary row operations on matrices.	2.2	April May
Use matrices and Gauss-Jordan elimination to solve systems of linear equations.	2.2	April May
Decide whether two matrices are equal.	2.2	April May
Add and subtract matrices and multiply matrices by scalars.	2.2	April May
Multiply two matrices.	2.2	April May
Use matrix operations to model and solve real-life problems.	2.2	April May
Verify that two matrices are inverses of each other.	2.2	April May
Use Gauss-Jordan elimination to find inverses of matrices.	2.2	April May
Use a formula to find inverses of 2x2 matrices.	2.2	April May
Use inverse matrices to solve systems of linear equations.	2.2	April May
Find the determinants of 2x2 matrices.	2.2	April May
Find the determinants of square matrices.	2.2	April May
Recognize a conic as the intersection of a plane and a double-napped cone.	2.2	May June
Write equations of circles in standard form.	2.2	May June

Write equations of parabolas in standard form.	2.2	May June
Use the reflective property of parabolas to solve real-life problems.	2.2	May June
Write equations of ellipses in standard form.	2.2	May June
Use properties of ellipses to model and solve real-life problems.	2.2	May June
Find eccentricities of ellipses.	2.2	May June
Write equations of hyperbolas in standard form.	2.2	May June
Find asymptotes of and graph hyperbolas.	2.2	May June
Use properties of hyperbolas to solve real-life problems.	2.2	May June
Classify conics from their general equations.	2.2	May June

ASSESSMENTS

PSSA Academic Standards, Assessment Anchors, and Eligible Content: The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

Formative Assessments: The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

Effective formative assessments for this course include: Suggested but not limited to: Bell Ringers, Exit Ticket, Cooperative Learning, Observations, Written work, Quizzes, Oral response, Self-evaluation, Homework

Summative Assessments: The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

Effective summative assessments for this course include: Suggested but not limited to: Performance Assessment, Tests