

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Pre-Calculus CP

Course Number: 00270

Course Prerequisites: Recommended grade average of 75% of higher in Algebra I CP, Algebra II CP, and Geometry CP.

Course Description: Pre-Calculus College Preparatory is an academic course designed to solidify the fundamental concepts of high school algebra and geometry. Major topics include functions and their graphs, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, and analytic trigonometry.

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: Academic

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.

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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).

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SCOPE AND SEQUENCE OF CONTENT, CONCEPTS, AND SKILLS

Performance Indicator	PA Core Standard and/or Eligible Content	Month Taught and Assessed for Mastery
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
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

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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 applications.	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	November December
Find the domains of rational functions.	2.2	November December
Find vertical and horizontal asymptotes of rational functions.	2.2	November December
Use rational functions to model and solve real life problems.	2.2	November December
Analyze and sketch graphs of rational functions.	2.2	November December
Sketch graphs of rational functions that have slant asymptotes.	2.2	November December

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Use graphs of rational functions to model and solve real life problems.	2.2	November December
Classify scatter plots.	2.2	November December
Use scatter plots and a graphing utility to find quadratic models for data.	2.2	November December
Choose a model that best fits a set of data.	2.2	November December
Recognize and evaluate exponential functions with base a.	2.2	January February
Graph exponential functions with base a.	2.2	January February
Recognize and evaluate and graph exponential functions with base e.	2.2	January February
Use exponential functions to model and solve real life problems.	2.2	January February
Recognize and evaluate logarithmic functions with base a.	2.2	January February
Graph logarithmic functions with base a.	2.2	January February
Recognize, evaluate, and graph natural logarithmic functions.	2.2	January February
Use logarithmic functions to model and solve real life problems.	2.2	January February
Rewrite logarithms with different bases.	2.2	January February
Use properties of logarithms to evaluate or rewrite logarithmic expressions.	2.2	January February
Use properties of logarithms to expand or condense logarithmic expressions.	2.2	January February
Use logarithmic functions to model and solve real life problems.	2.2	January February
Solve simple exponential and logarithmic equations.	2.2	January February
Solve more complicated exponential equations.	2.2	January February
Solve more complicated logarithmic equations.	2.2	January February
Use exponential and logarithmic equations to model and solve real life problems.	2.2	January February
Recognize the five most common types of models involving exponential or logarithmic functions.	2.2	January February
Use exponential growth and decay functions to model and solve real life problems.	2.2	January February
Use Gaussian functions to solve and model real life problems.	2.2	January February
Use logistic growth functions to model and solve real life problems.	2.2	January February
Use logarithmic functions to model and solve real life problems.	2.2	January February
Classify scatterplots.	2.2	January February
Use scatterplots and a graph utility to find models for data and determine the model that best fits a set of data.	2.2	January February

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Use a graphing utility to find exponential and logistic models for data.	2.2	January February
Describe angles.	2.3	February March
Use radian measure.	2.2	February March
Use degree measure and convert between degrees and radians.	2.2	February March
Use angles to model and solve real life problems.	2.3	February March
Identify the unit circle and describe its relationship to real numbers.	2.2	February March
Evaluate trigonometric functions using the unit circle.	2.2	February March
Use domain and period to evaluate sine and cosine functions.	2.2	February March
Use a calculator to evaluate trigonometric functions.	2.2	February March
Evaluate trigonometric functions of acute angles.	2.2	February March
Use fundamental trigonometric identities.	2.2	February March
Use trigonometric identities to solve and model real life problems.	2.2	February March
Evaluate trigonometric functions of any angle.	2.2	February March
Find reference angles.	2.2	February March
Evaluate trigonometric functions of real numbers.	2.2	February March
Sketch the graphs of basic sine and cosine functions.	2.2	March April
Use amplitude and period to sketch the graphs of sine and cosine functions.	2.2	March April
Sketch translations of graphs of sine and cosine functions.	2.2	March April
Use sine and cosine functions to model real life data.	2.2	March April
Sketch the graph of tangent functions.	2.2	March April
Sketch the graph of cotangent functions.	2.2	March April
Sketch the graph of secant and cosecant functions.	2.2	March April
Evaluate and graph inverse sine functions.	2.2	March April
Evaluate and graph other inverse functions.	2.2	March April
Evaluate composition of trigonometric functions.	2.2	March April
Solve real life problems involving right triangles.	2.2, 2.3	March April
Solve real life problems involving directional bearings.	2.2	March April
Solve real life problems involving harmonic motion.	2.2	March April

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Recognize and write the fundamental trigonometric identities.	2.2	April May
Use the fundamental trigonometric identities to evaluate trigonometric functions, simplify trigonometric expressions, and rewrite trigonometric expressions.	2.2	April May
Verify trigonometric identities.	2.2	April May
Use standard algebraic techniques to solve trigonometric equations.	2.2	April May
Solve trigonometric equations of quadratic type.	2.2	April May
Solve trigonometric equations involving multiple angles.	2.2	April May
Use inverse trigonometric functions to solve trigonometric equations.	2.2	April May
Use sum and difference formulas to evaluate trigonometric functions, verify trigonometric identities, and solve trigonometric equations.	2.2	April May
Use multiple-angle formulas to rewrite and evaluate trigonometric functions.	2.2	April May
Use power-reducing formulas to rewrite and evaluate trigonometric functions.	2.2	April May
Use half-angle formulas to rewrite and evaluate trigonometric functions.	2.2	April May
Use product-to-sum and sum-to-product formulas to rewrite and evaluate trigonometric functions.	2.2	April May
Use the Law of Sines to solve oblique triangles.	2.2	April May
Find areas of oblique triangles and use the Law of Sines to model and solve real-life problems.	2.2	April May
Use the Law of Cosines to solve oblique triangles.	2.2	April May
Use the Law of Cosines to model and solve real-life problems.	2.2	April May
Use Heron's Area Formula to find areas of triangles.	2.2	April May

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