

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Honors Calculus

Course Number: 00291

Course Prerequisites: Completion of Pre-Calculus Honors or Pre-Calculus CP with an average of 80% or above.

Course Description: This is the first course in the Calculus sequence and is intended for all mathematics, engineering, and science students who want to further their fundamental knowledge of mathematics. This course is designed to study: limits, derivatives, trigonometric functions, the integral, and applications of these ideas in various math, science, and physics problems.

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:

CSPG #50 Mathematics

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: 02121

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.

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:

Title: Calculus AP
Publisher: Cengage Learning
ISBN #: 9781337286886
Copyright Date: 2018
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).

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

SCOPE AND SEQUENCE OF CONTENT, CONCEPTS, AND SKILLS

Performance Indicator	PA Core Standard and/or Eligible Content	Month Taught and Assessed for Mastery
Sketch the graph of linear functions.	Click or tap here to enter text.	August September
Calculate x and y intercepts.	Click or tap here to enter text.	August September
Test a graph for symmetry with respect to an axis and the origin.	Click or tap here to enter text.	August September
Find the points of intersection of two graphs.	Click or tap here to enter text.	August September
Find the slope of a line passing through two points.	Click or tap here to enter text.	August September
Find the equation of a line in slope intercept, point slope form, standard form and general form.	Click or tap here to enter text.	August September
Write equations of lines that are parallel or perpendicular to a given line.	Click or tap here to enter text.	August September
Use function notation to represent and evaluate a function.	Click or tap here to enter text.	August September
Find the domain and range of a function.	Click or tap here to enter text.	August September
Sketch the graph of a function.	Click or tap here to enter text.	August September
Complete transformations of functions.	Click or tap here to enter text.	August September
Classify functions and recognize combination of functions.	Click or tap here to enter text.	August September
Determine if a function is even, odd, or neither	Click or tap here to enter text.	August September
Describe angles and use degree measure.	Click or tap here to enter text.	August September
Find co-terminal angles of trigonometric functions.	Click or tap here to enter text.	August September
Convert angle measures between radians and degrees.	Click or tap here to enter text.	August September
Define the six trigonometric functions (sin, cos, tan, sec, csc, cot).	Click or tap here to enter text.	August September
Evaluate trigonometric functions.	Click or tap here to enter text.	August September
Solve a trigonometric equation.	Click or tap here to enter text.	August September
Identify and graph trigonometric function.	Click or tap here to enter text.	August September
Use a TI- 89 calculator to evaluate trigonometric functions.	Click or tap here to enter text.	August September
Evaluate a limit using properties of limits.	Click or tap here to enter text.	September September
Evaluate a limit using direct substitution.	Click or tap here to enter text.	September September
Evaluate a limit using dividing out technique.	Click or tap here to enter text.	September Choose an item.
Evaluate a limit using the rationalizing techniques..	Click or tap here to enter text.	September Choose an item.

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

Use a TI – 89 graphing calculator to determine the limit graphically and/or analytically.	Click or tap here to enter text.	September Choose an item.
Apply the squeeze Theorem to determine limits.	Click or tap here to enter text.	September Choose an item.
Determine continuity at a point and on an open interval.	Click or tap here to enter text.	September Choose an item.
Determine one sided limits and continuity on a closed interval.	Click or tap here to enter text.	September Choose an item.
Calculate x-values for which a function is not continuous.	Click or tap here to enter text.	September Choose an item.
Determine removable discontinuities as holes in graphs.	Click or tap here to enter text.	September Choose an item.
Determine non-removable discontinuities as vertical asymptotes in graphs.	Click or tap here to enter text.	September Choose an item.
Graphically estimate the slope of a curve at a given point using secant lines.	Click or tap here to enter text.	October November
Apply the definition of a derivative to calculate $f'(x)$.	Click or tap here to enter text.	October November
Find the equation of the tangent line to the graph of the function $f(x)$.	Click or tap here to enter text.	October November
Find the equation of a line that is tangent to the graph of the function $f(x)$ and is parallel to a second line.	Click or tap here to enter text.	October November
Find the derivative of a function using shortcut rules.	Click or tap here to enter text.	October November
Find the value of the derivative at a given point.	Click or tap here to enter text.	October November
Determine the points at which the function has a horizontal tangent line.	Click or tap here to enter text.	October November
Calculate instantaneous rates of change, velocities, and acceleration using derivatives.	Click or tap here to enter text.	October November
Differentiate algebraic functions using the power, product, and quotient rules.	Click or tap here to enter text.	October November
Find the derivatives of trigonometric functions.	Click or tap here to enter text.	October November
Find higher order derivatives using power, product, and chain rules.	Click or tap here to enter text.	October November
Differentiate algebraic functions using the chain rule.	Click or tap here to enter text.	October November
Find higher order derivatives using the chain rule.	Click or tap here to enter text.	October November
Find the first and second derivatives of trigonometric functions using chain rule.	Click or tap here to enter text.	October November
Find dy/dx using implicit differentiation.	Click or tap here to enter text.	October November
Evaluate a derivative at a given point using implicit differentiation.	Click or tap here to enter text.	October November
Find the slope of a tangent line to the graph at a given point.	Click or tap here to enter text.	October November
Interpret optical illusions using implicit differentiation.	Click or tap here to enter text.	October November
Find the indicated values of dy/dt and dx/dt for differentiable functions.	Click or tap here to enter text.	October November
Apply velocity and acceleration problems for indicated values of x using implicit differentiation.	Click or tap here to enter text.	October November

WARREN COUNTY SCHOOL DISTRICT		
PLANNED INSTRUCTION		
Calculate the related rates of various word problems using implicit differentiation.	Click or tap here to enter text.	October November
Find the value of the derivative at an indicated extrema.	Click or tap here to enter text.	November December
Find the critical numbers of a function.	Click or tap here to enter text.	November December
Locate the absolute extrema of a function on a closed interval.	Click or tap here to enter text.	November December
Determine from a graph a max or min in an open interval.	Click or tap here to enter text.	November December
Determine if Rolle's Theorem can be applied to a function on an indicated interval.	Click or tap here to enter text.	November December
Apply Rolle's Theorem to find all c values such that $f'(c) = 0$.	Click or tap here to enter text.	November December
Determine if the Mean Value Theorem can be applied to a function on an indicated interval.	Click or tap here to enter text.	November December
Apply the Mean Value Theorem to find c values on the indicated interval.	Click or tap here to enter text.	November December
Graphically identify the open intervals on which a function is increasing or decreasing.	Click or tap here to enter text.	November December
Find the critical number of a function.	Click or tap here to enter text.	November December
Calculate the open intervals on which a graph is increasing or decreasing using the First Derivative Test.	Click or tap here to enter text.	November December
Graphically determine the open intervals on which a functions is concave upward or concave downward.	Click or tap here to enter text.	November December
Find all extrema using the Second Derivative Test	Click or tap here to enter text.	November December
Find all points of inflection.	Click or tap here to enter text.	November December
Sketch graphs using the First and Second Derivative Tests.	Click or tap here to enter text.	November December
Match a function to its graph using horizontal and vertical asymptotes.	Click or tap here to enter text.	November December
Find limits at infinity.	Click or tap here to enter text.	November December
Sketch a graph using extrema, intercepts, asymptotes, and symmetry.	Click or tap here to enter text.	November December
Apply the definition of First and Second derivative tests to determine the optimal area, volume, cost, or perimeter of various problems.	Click or tap here to enter text.	November December
Use differentials to evaluate and compare change in y and dy.	Click or tap here to enter text.	November December
Find the differential dy of a function.	Click or tap here to enter text.	November December
Geometrically interpret differential equations using slope fields.	Click or tap here to enter text.	November December
Interpret the relationship between slope fields with solution curves of differential equations.	Click or tap here to enter text.	November December
Find the general solution of a differential equation and check the result using differentiation.	Click or tap here to enter text.	January February
Evaluate indefinite integrals and check the result using differentiation.	Click or tap here to enter text.	January February
Find sums given Sigma Notation.	Click or tap here to enter text.	January February

WARREN COUNTY SCHOOL DISTRICT		
PLANNED INSTRUCTION		
Use Sigma notation to write sums using expressions.	Click or tap here to enter text.	January February
Use properties of Sigma notation to evaluate sums.	Click or tap here to enter text.	January February
Find limits at infinity.	Click or tap here to enter text.	January February
Use upper and lower sums to approximate the area of a region using the indicated number of subintervals.	Click or tap here to enter text.	January February
Calculate the area under a function.	Click or tap here to enter text.	January February
Sketch the region whose area is indicted by a definite integral	Click or tap here to enter text.	January February
Use a geometric formula to calculate the area under a curve.	Click or tap here to enter text.	January February
Evaluate definite integrals using the Fundamental Theorem of Calculus (FTOC).	Click or tap here to enter text.	January February
Evaluate the definite integrals of trigonometric functions using the FTOC.	Click or tap here to enter text.	January February
Determine the area of an indicated region.	Click or tap here to enter text.	January February
Find the area of the region bounded by the graphs of the equations.	Click or tap here to enter text.	January February
Find the value of "c" generated by the Mean Value Theorem for Integrals for the function over the specified intervals.	Click or tap here to enter text.	January February
Integrate to find F as a function of x.	Click or tap here to enter text.	January February
Apply the second FTOC to find F as a function of x.	Click or tap here to enter text.	January February
Identify u and du for a given interval.	Click or tap here to enter text.	January February
Evaluate definite and indefinite integrals using u substitution.	Click or tap here to enter text.	January February
Use the trapezoidal Rule and Simpsons Rule to approximate the value of an indicated definite integral for an indicated value of n.	Click or tap here to enter text.	January February
Use the error formulas to find the maximum possible error in approximating the integral with $n = 4$ for the Trapezoidal and Simpsons Rules.	Click or tap here to enter text.	January February
Use Simpsons Rule to approximate pi using a given equation.	Click or tap here to enter text.	January February
Use the graph of $f(x) = \ln(x)$ to match each function with its graph.	Click or tap here to enter text.	March April
Sketch the graph of a function and state its domain.	Click or tap here to enter text.	March April
Use the properties of logarithms to write expressions as sums or differences of multiple logs.	Click or tap here to enter text.	March April
Use the properties of logs to write single expressions of logs.	Click or tap here to enter text.	March April
Recognize and evaluate definite integrals involving the natural log function.	Click or tap here to enter text.	March April
Show that two functions F and G are inverses of each by showing that $f(g(x)) = g(f(x))$.	Click or tap here to enter text.	March April
Use a TI = 89 graphing calculator to graph functions and their inverses.	Click or tap here to enter text.	March April
Find the inverse of a function, if it has one.	Click or tap here to enter text.	March April

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

Write exponential equations as logarithmic equations	Click or tap here to enter text.	March April
Find the derivative of exponential functions.	Click or tap here to enter text.	March April
Use implicit differentiation to find dy/dx	Click or tap here to enter text.	March April
Find the second derivative of exponential and logarithmic functions.	Click or tap here to enter text.	March April
Evaluate inverse trigonometric functions without using a calculator.	Click or tap here to enter text.	March April
Evaluate expressions using a right triangle.	Click or tap here to enter text.	March April
Write a sentence describing the meaning of various trigonometric functions.	Click or tap here to enter text.	March April
Evaluate integrals involving inverse trigonometric functions.	Click or tap here to enter text.	March April
THE FOLLOWING ARE OPTIONAL PERFORMANCE INDICATORS	Click or tap here to enter text.	April May
Find the area of a region bounded by two curves.	Click or tap here to enter text.	April May
Sketch the region bounded by the graphs of two or more algebraic functions and find the area of that region.	Click or tap here to enter text.	April May
Find the volume of a solid formed by revolving a region about the x-axis using the Disk/Washer Method.	Click or tap here to enter text.	April May
Find the volume of a solid formed by revolving a region about the y –axis using the Disk/Washer Method.	Click or tap here to enter text.	April May
Find the volume of a solid generated by revolving the region bounded by graphs of equations about an indicated line using the Disk/Washer Method.	Click or tap here to enter text.	April May
Find the volume of a solid with known cross sections.	Click or tap here to enter text.	April May
Find the volume of a solid formed but revolving a region about the x-axis using the Shell Method.	Click or tap here to enter text.	April May
Find the volume of a solid formed by revolving a region about the y-axis using the Shell Method.	Click or tap here to enter text.	April May
Find the volume of a solid generated by revolving the region bounded by the graphs of the equations about the indicated line using the Shell Method.	Click or tap here to enter text.	April May
Find the arc length of a smooth curve.	Click or tap here to enter text.	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, cooperative learning, exit tickets, observations, written work, oral response, self-evaluation, homework, projects, and quizzes.

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 assessments, unit tests, chapter tests, and projects.