SOMERSET COUNTY VOCATIONAL & TECHNICAL SCHOOLS
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Calculus Curriculum

Topic/ Pacing	Unit 1: Functions, Graphs, and Limits Topics for this unit include: • The Cartesian Plane and the Distance Formula • Graphs of Equations • Lines in the Plan and Slope • Functions • Limits • Continuity Pacing for this unit is approximately 1 month.	Unit 2 AND Unit 4: Differentiation (Including Exponential and Logarithmic Functions) Topics for this unit include: • The Derivative and the Slope of a Graph • Some Rules for Differentiation • Rates of Change: Velocity and Marginals • The Product and Quotient Rules • The Chain Rule • Higher Order Derivatives • Implicit Differentiation • Related Rates • Derivatives of Exponential Functions • Derivatives of Logarithmic Functions	Unit 3: Applications of the Derivatives Topics for this unit include: • Increasing and Decreasing Functions • Extrema and the First-Derivative Test • Concavity and the Second-Derivative Test • Optimization Problems • Business and Economic Applications • Asymptotes • Curve Sketching: A Summary • Differential and Marginal Analysis Pacing for this unit is approximately 2 months.	Unit 5 AND Unit 6: Integration and Its Applications (Including Advanced Techniques for Integration) Topics for this unit include: • Antiderivatives and Indefinite Integrals • Integration by Substitution and the General Power Rule • Exponential and Logarithmic Integrals • Area and the Fundamental Theorem of Calculus • The Area of a Region Bounded by Two Graphs • The Definite Integral as the Limit of a Sum • Integration by Parts and Present Value

		Pacing for the combination of these units is approximately 3 months.		• Partial Fractions and Logistic Growth • Improper Integrals Pacing for the combination of these units is approximately 4 months.
NJSLS	• NJSLS.F-IF.A.1 • NJSLS.F-IF.B.5 • NJSLS.F-IF.C.7 • NJSLS.F-IF.B.6	• NJSLS.F-IF.A.1 • NJSLS.F-IF.B.5 • NJSLS.F-IF.C.7 • NJSLS.F-IF.B.6	• NJSLS.F-IF.A.1 • NJSLS.F-IF.B.5 • NJSLS.F-IF.C.7 • NJSLS.F-IF.B.6	• NJSLS.F-IF.A.1 • NJSLS.F-IF.B.5 • NJSLS.F-IF.C.7 • NJSLS.F-IF.B.6
Technology Ed.	8.1.12DA1-6 8.1.12AP1-2	8.1.12DA1-6 8.1.12AP1-2	8.1.12DA1-6 8.1.12AP1-2	8.1.12DA1-6 8.1.12AP1-2
21st Century Knowledge & Skills	9.4.12CI1-3 9.4.12CT2 • Critical Thinking and Problem Solving • Communication and Collaboration • Life and Career Skills • Creativity • Collaboration • Technology Literacy • Productivity	9.4.12CI1-3 9.4.12CT2 • Critical Thinking and Problem Solving • Communication and Collaboration • Life and Career Skills • Creativity • Collaboration • Technology Literacy • Productivity	9.4.12CI1-3 9.4.12CT2 • Critical Thinking and Problem Solving • Communication and Collaboration • Life and Career Skills • Creativity • Collaboration • Technology Literacy Productivity	9.4.12CI1-3 9.4.12CT2 • Critical Thinking and Problem Solving • Communication and Collaboration • Life and Career Skills • Creativity • Collaboration • Technology Literacy Productivity

Skills (SWBAT)	• Plot Points in a coordinate plane and read data presented graphically. • Find the distance between two points in a coordinate plane. • Find the midpoints of line segments connecting two points. • Translate points in a coordinate plane • Sketch Graphs of Equations by Hand • Write the x and y intercepts of graphs of equations • Write the standard form of equations of circles • Write the points of intersection of two graphs • Use mathematical models to model and solve real-life problems • Use the slope intercept form of a linear equation to sketch graphs	• Identify tangent lines to a graph at a point • Approximate the slopes of tangent lines to graphs at points • Use the limit definition to find the slopes of graphs at points • Use the limit definition to find the derivative of functions • Describe the relationship between differentiability and continuity • Find the derivatives of functions using the Constant Rule, the Power Rule, the Constant Multiple Rule, and/or the Sum and Difference Rule • Use derivative to answer questions about real-life situations • Find the average rate of change of functions over intervals	• Test for Increasing and Decreasing Functions • Find the critical numbers of functions and find the open intervals on which functions are increasing or decreasing • Use increasing and decreasing functions to model and solve real-life problems • Recognize the occurrence of relative extrema of functions • Use the First-Derivative Test to find the relative extrema of functions • Find absolute extrema of continuous functions on a closed interval • Find minimum and maximum values of real-life models and interpret the results in context • Determine the intervals on which the graphs of	• Understand the definition of antiderivative • Use indefinite integral notation for antiderivative • Use basic integration rules to find antiderivatives • Use initial conditions to find particular solutions of indefinite integrals • Use antiderivatives to solve real-life problems • Use the General Power Rule to find indefinite integrals • Use substitution to find indefinite integrals • Use the General Power Rule to solve real-life problems • Use the exponential Rule to find indefinite integrals • Use the Log Rule to find indefinite integrals • Evaluate definite integrals using the Fundamental

	• Find slopes of lines passing through two points • Use the point-slope form to write equations of lines • Find equations of parallel and perpendicular lines • Decide whether relations between two variables are functions • Find the domains and ranges of functions • Use function notation and evaluate functions • Combine functions to create other functions • Find inverse function algebraically • Find limits of functions graphically and numerically • Use the properties of limits to evaluate limits of functions • Use different analytic techniques to evaluate limits of functions.	• Find the instantaneous rate of change of functions at points • Find the marginal revenues, marginal costs, and marginal profits for products • Find the derivatives of functions using the Product Rule and/or the Quotient Rule • Simplify Derivatives • Find derivatives using the Chain Rules and/or the General Power Rule • Find higher-order derivatives • Find and use the position functions to determine the velocity and acceleration of moving objects • Find derivatives both implicitly and explicitly • Examine related variables • Solve related-rate problems • Find the derivatives of natural	functions are concave upward or concave downward • Find the points of inflection of the graphs of functions • Use the Second-Derivative Test to find the relative extrema of functions • Find the points of diminishing returns of input-output models • Solve real-life optimization problems • Solve business and economics optimization problems • Find the price elasticity of demand for demand functions • Recognize basic business terms and formulas • Find the vertical asymptotes of functions and find infinite limits • Find the horizontal asymptotes of functions and find limits at infinity	Theorem of Calculus • Use definite integrals to solve marginal analysis problems • Find the average values of functions over closed intervals • Use properties of even and odd functions to help evaluate definite integrals • Find the amounts of annuities • Find the areas of regions bounded by two graphs • Find consumer and producer surpluses • Use the areas of regions bounded by two graphs to solve real-life problems • Use the Midpoint Rule to approximate definite integrals • Use a symbolic integration utility to approximate definite integrals • Use integration by parts to find

	• Evaluate one-sided limits • Recognize unbounded behavior of functions • Determine the continuity of functions • Use compound interest models to solve real-life problems	exponential functions • Use calculus to analyze the graphs of functions that involve the natural exponential function • Explore the normal probability density function • Find the derivatives of natural logarithmic functions • Use calculus to analyze the graphs of functions that involve the natural logarithmic function • Find derivatives of exponential and logarithmic functions involving other bases.	• Use asymptotes to answer questions about real-life situations • Analyze the graphs of functions • Recognize the graphs of simple polynomial functions • Find the differentials of functions • Use differentials to approximate changes in functions • Use differentials to approximate changes in real-life models	indefinite and definite integrals • Find the present value of future income • Use partial fractions to find indefinite integrals • Use logistic growth functions to model real-life situations • Recognize improper integrals • Evaluate improper integrals with infinite limits of integrations and/or infinite integrands • Use improper integrals to solve real-life problems • Find the present value of a perpetuity
Assessments/Bench marks	The textbook has questions at the end of each lesson. Furthermore, each unit contains a mid-chapter quiz as well as a chapter test.	The textbook has questions at the end of each lesson. Furthermore, each unit contains a mid-chapter quiz as well as a chapter test.	The textbook has questions at the end of each lesson. Furthermore, each unit contains a mid-chapter quiz as well as a chapter test.	The textbook has questions at the end of each lesson. Furthermore, each unit contains a mid-chapter quiz as well as a chapter test.
Resources	Promethean Board TI-84 Plus CE TI-34 Multi View Text: Brief Calculus An Applied Approach, Eighth Edition – By Ron Larson	Promethean Board TI-84 Plus CE TI-34 Multi View Text: Brief Calculus An Applied Approach, Eighth Edition – By Ron Larson	Promethean Board TI-84 Plus CE TI-34 Multi View Text: Brief Calculus An Applied Approach, Eighth Edition – By Ron Larson	Promethean Board TI-84 Plus CE TI-34 Multi View Text: Brief Calculus An Applied Approach, Eighth Edition – By Ron Larson

Accommodations	• Frequently check for understanding • Extended time on tests/quizzes/projects as needed • Encourage students to ask for assistance when needed • Use physical proximity to increase student's attention to instruction • Repeat or rephrase directions and/or clarify and reword directions • Accompany oral directions with written directions • Provide a calculator for math computation • Break down tasks into smaller, more manageable chunks with frequent teacher checks • Provide verbal praise and positive reinforcement • Allow the student to use an alternate method	• Frequently check for understanding • Extended time on tests/quizzes/projects as needed • Encourage students to ask for assistance when needed • Use physical proximity to increase student's attention to instruction • Repeat or rephrase directions and/or clarify and reword directions • Accompany oral directions with written directions • Provide a calculator for math computation • Break down tasks into smaller, more manageable chunks with frequent teacher checks • Provide verbal praise and positive reinforcement • Allow the student to use an alternate method	• Frequently check for understanding • Extended time on tests/quizzes/projects as needed • Encourage students to ask for assistance when needed • Use physical proximity to increase student's attention to instruction • Repeat or rephrase directions and/or clarify and reword directions • Accompany oral directions with written directions • Provide a calculator for math computation • Break down tasks into smaller, more manageable chunks with frequent teacher checks • Provide verbal praise and positive reinforcement • Allow the student to use an alternate method	• Frequently check for understanding • Extended time on tests/quizzes/projects as needed • Encourage students to ask for assistance when needed • Use physical proximity to increase student's attention to instruction • Repeat or rephrase directions and/or clarify and reword directions • Accompany oral directions with written directions • Provide a calculator for math computation • Break down tasks into smaller, more manageable chunks with frequent teacher checks • Provide verbal praise and positive reinforcement • Allow the student to use an alternate method

	of production (e.g. computer/chrome book) • Provide multi-sensory instruction • Provide a word bank • Provide frequent repetition in instruction • Provide clear and consistent academic and behavior expectations • Redirect/refocus attention • Modify tests/ quizzes as needed	of production (e.g. computer/chrome book) • Provide multi-sensory instruction • Provide a word bank • Provide frequent repetition in instruction • Provide clear and consistent academic and behavior expectations • Redirect/refocus attention • Modify tests/ quizzes as needed	of production (e.g. computer/chrome book) • Provide multi-sensory instruction • Provide a word bank • Provide frequent repetition in instruction • Provide clear and consistent academic and behavior expectations • Redirect/refocus attention • Modify tests/ quizzes as needed	of production (e.g. computer/chrome book) • Provide multi-sensory instruction • Provide a word bank • Provide frequent repetition in instruction • Provide clear and consistent academic and behavior expectations • Redirect/refocus attention • Modify tests/ quizzes as needed
Enrichment	Various enrichment activities can be found throughout the text.	Various enrichment activities can be found throughout the text.	Various enrichment activities can be found throughout the text.	Various enrichment activities can be found throughout the text.