Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit P - Prerequisites	
Big Idea: Review of functions	
PA Content Standards: A2.2.1.1 Analyze and/or use patterns or relations A2.2.2.1 Create, interpret, and/or use polynomial, exponential, and/or logarithmic functions and their equations, graphs or tables A2.2.2.2 Describe and/or determine families of functions	**PA Core Standards:** CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context. CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations. CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions. 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: How do you analyze the graph of a function? How do you identify the graphs of piecewise functions? How do you evaluate functions? How do you use the unit circle to find exact values of trigonometric functions? How do you simplify rational expressions?	**Understandings (SWKT…):** - Parent graphs - Domain and Range - Discontinuities - Transformations of graphs - Piecewise functions - Function notation - Unit circle values - Simplifying rational expressions

Vocabulary:	**Skills (SWBAT…):**
- Function - Domain - Range - Asymptote - Reflection - Translation - Dilation - Piecewise function - Rational expression	- Identify a parent graph from a function. - Describe the domain, range and discontinuities of a function's graph. - Use transformations to create graphs. - Match a piecewise function to its graph. - Evaluate functions using expressions, tables and graphs. - Find an exact value of a trigonometric function on the unit circle. - Simplify a rational expression through factoring.
Assessments: - Desmos graph - Worksheets	**Resources:** - Worksheets - Chromebooks - Matching card sets - Textbook

Elizabethtown Area School District Curriculum Date Adopted:

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 1 - Limits	
Big Idea: Evaluating limits	
PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: How do you evaluate limits numerically? How do you evaluate limits graphically?	**Understandings (SWKT…):** - Evaluating limits - Removable and nonremovable discontinuities

How do you evaluate limits algebraically? How do you use limits to identify discontinuities? How do you evaluate one-sided limits? How do you evaluate infinite limits?	- One-sided limits - Infinite limits
Vocabulary: - Limit - Indeterminate form - Rationalizing	**Skills (SWBAT…):** - Evaluate limits numerically, graphically and algebraically. - Determine if a function is continuous or has a removable or nonremovable discontinuity. - Evaluate one-sided limits - Evaluate infinite limits
Assessments: - Quiz - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks

Elizabethtown Area School District Curriculum Date Adopted:

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 2 - Derivatives	
Big Idea: Finding derivatives, slopes of tangent lines and equations of tangent lines	

PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: - How do you find the derivative of a function? - How do you find the slope of a tangent line? - How do you find the equation of a tangent line? - How do you find a derivative implicitly? - How do you find a higher-order derivative?	**Understandings (SWKT…):** - Basic differentiation rules - Slopes of tangent lines - Equations of tangent lines - Product rule - Quotient rule - Chain rule - Trigonometric function derivatives - Implicit differentiation - Higher-order derivatives
Vocabulary: - Derivative - Differentiation - Tangent lines	**Skills (SWBAT…):** - Find the derivative of functions using basic differentiation rules, the product rule, the quotient rule and the chain rule. - Find the derivative of trigonometric functions. - Find the slope of a tangent line using the derivative. - Find the equation of a tangent line using the derivative. - Find the derivative of an equation using implicit differentiation. - Find a higher-order derivative.
Assessments: - Quizzes - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 3 - Applications of Derivatives	
Big Idea: Applying derivatives to real-world problems.	
PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: - How do you find an object's velocity and acceleration with derivatives? - How do you analyze a graph using derivatives? - How to you find an optimal value using derivatives? - How do you find rates of change over time using derivatives?	**Understandings (SWKT…):** - Velocity and Acceleration - Extrema and Points of Inflection - Intervals of increasing, decreasing, and concavity - Optimization - Rates of change over time
Vocabulary: - Velocity - Acceleration - Extrema - Points of Inflection - Concavity - Optimization	**Skills (SWBAT…):** - Represent and find an object's velocity and acceleration using derivatives. - Describe the graph of a function by identifying extrema, points of inflection, intervals of increasing and decreasing, and intervals of concavity using derivatives. - Find an optimal value in a given situation using derivatives. - Find a rate of change over time in a given situation with multiple changing rates.

Assessments: - Quizzes - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks

Elizabethtown Area School District Curriculum Date Adopted:

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 4 - Integrals	
Big Idea: Finding indefinite and definite integrals	
PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: How do you find an antiderivative? How do you find a particular solution? How do you find an area of a region bounded by a function and the x-axis?	**Understandings (SWKT…):** - Integral notation - Antiderivatives - Particular solutions - Definite integrals - Area - Fundamental Theorem of Calculus

Vocabulary: - integral - antiderivative - definite integral	**Skills (SWBAT…):** - Find an antiderivative. - Find a particular solution. - Represent the area of a region bounded by a function and the x-axis as a definite integral. - Find the Geometric area of a region bounded by a function and the x-axis. - Find the area of a region bounded by a function and the x-axis with the Fundamental Theorem of Calculus.
Assessments: - Quizzes - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 5 - Applications of Integrals	
Big Idea: Using integrals to find area, volume, surface area and arc length	
PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations.

	13.1.11.E: Justify the selection of a career.
Essential Questions: How do you find the area between two curves? How do you find the volume of a bounded region revolved about a line? How do you find the arc length of a function on an interval? How do you find the surface area of a bounded region revolved about a line?	**Understandings (SWKT…):** Using definite integrals to find the following: - Area between 2 curves - Volume using disks, washers and shells - Arc length - Surface area
Vocabulary:	**Skills (SWBAT…):** - Find the area between two curves. - Find the volume of a bounded region revolved about a line using the disk, washer and shell methods. - Find the arc length of a function on an interval. - Find the surface area of a bounded region revolved about a line.
Assessments: - Quizzes - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks

Grade, Subject: 9 - 12, Honors Calculus	
Strand (Unit): Unit 6 - Logarithms and Exponentials	
Big Idea: Finding derivatives and antiderivatives that involve natural logarithms and exponential expressions	
PA Content Standards:	**PA Core Standards:** 13.3.11.E: Evaluate time management strategies and their application to both personal and work situations. 13.1.11.E: Justify the selection of a career.
Essential Questions: How do you find the derivative of the natural log function? How do you find the derivative of an exponential function? How do you find antiderivatives involving natural logarithms? How do you find the antiderivative of an exponential function?	**Understandings (SWKT…):** - Properties of Logarithms - Derivative of a natural logarithm - Derivative of an exponential function - Natural logarithms as antiderivatives - Exponential antiderivatives
Vocabulary:	**Skills (SWBAT…):** - Expand a natural logarithm using properties of logarithms. - Find the derivative of the natural log function. - Find the derivative of an exponential function. - Find antiderivatives involving natural logarithms. - Find the antiderivative of an exponential function.
Assessments: - Quizzes - Test - Assignments	**Resources:** - Worksheets - Chromebooks - Textbooks