AP CALCULUS

The Calculus objectives that follow are meant as a framework for *Career*Tech Centers and educators. They should aide in alignment of curriculum, supply additional resources, and assist in the assignment of high school calculus academic credit. A committee of Mathematics instructors compiled the list of necessary objectives that all *Career*Tech students should master upon completion of the course. C*areer*Tech upper division math courses demonstrate the Content and Process Standards of the National Council of Teachers of Mathematics (NCTM) and the Process Standards of Oklahoma Priority Academic Student Skills (PASS). Students are expected to problem solve, do reasoning and proofs, demonstrate mathematical communication, connect and link mathematical ideas to real-world and other disciplines, and use mathematical representations for modeling, interpreting, and communicating. Technology will be integrated into the course in order to prepare students for real-world situations.

Course Description:

This is a college preparatory course that offers extreme rigor in a specialized field of study. It will enable the student to be successful on the Advanced Placement AB Calculus exam and/or in college calculus. Topics covered will be: limits, differentiation, and basic integration techniques. An emphasis will be placed on real world applications as they relate to the various engineering fields as well as development of problem-solving skills. Prerequisites for the course are: Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus

Requirements for College Admission Status (Title 70 O.S. § 11-103.6)

These courses are to be taught by a highly qualified teacher with an Oklahoma Advanced Mathematics teaching certification. The students should be in the eleventh or twelfth grade or if a sophomore, they should be in a Focused Field of Career Study program. The course will have at a minimum, but may exceed, a duration of 120 hours within a school year.

Calculus
Syllabus

Objective	NCTM Standard	Oklahoma PASS Process Standard
I. Preparation for Calculus		
A. Sketch the graph of an equation	Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
B. Find the intercepts of a graph	Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
C. Test a graph for symmetry with respect to an axis and the origin	Number & Operations Algebra Measurement Geometry Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 3.3, 3.4, 5.1, 5.2
D. Find the points of intersection of two graphs	Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
E. Interpret mathematical models for real-life data	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
F. Find the slope of a line passing through two points	Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
G. Write the equations of a line with a given point and slope	Number & Operations Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
H. Interpret slope as a ratio or as a rate in a real-life application	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
I. Sketch the graph of a linear equation in	Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2

slope-intercept form		
J. Write equations of lines that are parallel or perpendicular to a given line	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
K. Use function notation to represent and evaluate a function	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
L. Find the domain and range of a function	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
M. Sketch the graph of a function	Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
N. Identify different types of transformations of functions	Number & Operations Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
O. Classify functions and recognize combinations of functions	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
P. Fit a linear model to a real-life data set	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
Q. Fit a quadratic model to a real-life data set	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
R. Fit a trigonometric model to a real-life data set	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
II. Limits and Their Properties		
A. Understand what calculus is and how it	Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 4.4, 5.1, 5.2

compares to pre-calculus	Algebra	
B. Understand that the tangent line problem is basic to calculus	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 4.4, 5.1, 5.2
C. Understand that the area problem is also basic to calculus	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 4.4, 5.1, 5.2
D. Estimate a limit using a numerical or graphical approach	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
E. Learn different ways that a limit can fail to exist	Number & Operations Data Analysis & Probability Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
F. Study and use a formal definition of a limit	Number & Operations Data Analysis & Probability Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
G. Evaluate a limit using properties of limits	Number & Operations Data Analysis & Probability Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
H. Develop and use a strategy	Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
I. Evaluate a limit using dividing out and rationalizing techniques	Number & Operations Data Analysis & Probability Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
J. Evaluate a limit using the Squeeze Theorem	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
K. Determine continuity at a point and continuity on an open interval	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
L. Determine one-sided limits and continuity on a closed	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2

interval	Measurement	
M. Use properties of continuity	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
N. Understand and use the Intermediate Value Theorem	Number & Operations Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
O. Determine infinite limits from the left and from the right	Number & Operations Data Analysis & Probability Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
P. Find and sketch the vertical asymptotes of the graph of a function	Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
III. Differentiation		
A. Find the slope of the tangent line to a curve at a point	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
B. Use the limit definition to find the derivative of a function	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
C. Understand the relationship between differentiability and continuity	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
D. Find the derivative of a function using the Constant Rule	Number & Operations Algebra Measure Data Analysis & Probability ment	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
E. Find the derivative of a function using the Power Rule	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
F. Find the derivative of a function using the Constant Multiple Rule	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
G. Find the derivative of a function using the	Number & Operations Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2

Sum and Difference Rules	Measurement Data Analysis & Probability	
H. Find the derivative of the sine function and of the cosine function	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
I. Use derivatives to find rates of change	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
J. Find the derivative of a function using the Product Rule	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
K. Find the derivative of a function using the Quotient Rule	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
L. Find the derivative of a trigonometric function	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
M. Find a higher-order derivative of a function	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
N. Find the derivative of a composite function using the Chain Rule	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
O. Find the derivative of a function using the General Power Rule	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
P. Simplify the derivative of a function using algebra	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
Q. Find the derivative of a trigonometric function using the Chain Rule	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2

R. Distinguish between functions written in implicit and explicit forms	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
S. Use implicit differentiation to find the derivative of a function	Number & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
T. Find a related rate	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
U. Use related rates to solve real-life problems	Number & Operations Algebra Measurement Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
IV. Applications of Differentiation		
A. Understand the definition of extrema of a function on an interval	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
B. Understand the definition of relative extrema of a function on an open interval	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
C. Find extrema on a closed interval	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 5.1, 5.2
D. Understand and use Rolle's Theorem	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
E. Understand and use the Mean Value Theorem	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
F. Determine intervals on which a function is increasing or decreasing	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
G. Apply the First Derivative Test to find relative extrema of a function	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3

H. Determine intervals on which a function is concave upward or downward	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
I. Find any points of inflection of the graph of a function	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.31.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
J. Apply the Second Derivative Test to find relative extrema of a function	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 5.2, 5.3
K. Determine (finite) limits at infinity	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
L. Determine the horizontal asymptotes of the graph of a function	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
M. Determine infinite limits at infinity	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
N. Analyze and sketch the graph of a function	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
O. Solve applied minimum and maximum problems	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
P. Approximate a zero of a function using Newton's Method	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
Q. Understand the concept of a tangent line approximation	Data Analysis & Probability Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
R. Compare the value of the differential, dy, with the actual change in y, delta y	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
S. Estimate a propagated error using a differential	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2

T. Find the differential of a function using differentiation formulas	Data Analysis & Probability Algebra Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
V. Integration		
A. Write the general solution of a differential equation	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
B. Use indefinite integral notation for antiderivatives	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
C. Use basic integration rules to find antiderivatives	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
D. Find a particular solution of a differential equation	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
E. Use sigma notation to write and evaluate a sum	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
F. Understand the concept of area	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
G. Approximate the areas of a plane region	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
H. Find the area of a plane region using limits	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
I. Understand the definition of a Riemann sum	Numbers & Operations Measurement Algebra	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2
J. Evaluate a definite integral using limits	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
K. Evaluate a definite integral using properties of definite integrals	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
L. Evaluate a definite integral using the	Numbers & Operations Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3

Fundamental Theorem of Calculus	Algebra Data Analysis & Probability	
M. Understand and use the Mean Value Theorem for Integrals	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
N. Find the average value of a function over a closed interval	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
O. Use pattern recognition to evaluate an indefinite integral	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
P. Use a change of variables to evaluate an indefinite integral	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
Q. Use the General Power Rule for Integration to evaluate an indefinite integral	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
R. Use a change of variables to evaluate a definite integral	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
S. Evaluate a definite integral involving an even or odd function	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
T. Approximate a definite integral using the Trapezoidal Rule	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
U. Approximate a	Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3,

definite integral using Simpson's Rule	Measurement Algebra Data Analysis & Probability	3.3, 4.2, 5.1, 5.2, 5.3
V. Analyze the approximate error I the Trapezoidal Rule and Simpson's Rule	Numbers & Operations Measurement Algebra Data Analysis & Probability	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
VI. Logarithmic, Exponential, and Other Transcendental Functions		
A. Develop and use properties of the natural logarithmic function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
B. Understand the definition of the number e	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
C. Find derivatives of functions involving the natural logarithmic function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
D. Use the Log Rule for Integration to integrate a rational function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
E. Integrate trigonometric functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
F. Verify that one function is the inverse function of another function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
G. Determine whether a function has a inverse function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
H. Find the derivative of an inverse function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
I. Develop properties of the natural exponential function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
J. Differentiate	Numbers & Operations	1.1, 1.2, 2.1, 2.2, 2.3,

natural exponential functions	Algebra Measurement	3.3, 4.2, 5.1, 5.2, 5.3
K. Integrate natural exponential functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
L. Define exponential functions that have bases other than e	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
M. Differentiate and integrate exponential functions that have bases other than e	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
N. Use exponential functions to model compound interest and exponential growth	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
O. Use separation of variables to solve a simple differential equation	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
P. Use exponential functions to model growth and decay in applied problems	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
Q. Use initial conditions to find particular solutions of differential equations	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
R. Recognize and solve differential equations that can be solved by separation of variables	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
S. Recognize and solve homogeneous differential equations	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
T. Use a differential equation to model and solve an applied problem	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
U. Develop properties of the six inverse trigonometric functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
V. Differentiate an	Numbers & Operations	1.1, 1.2, 2.1, 2.2, 5.1,

inverse trigonometric function	Algebra Measurement	5.2
W. Review the basic differentiation formulas for elementary functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
X. Integrate functions whose antiderivatives involve inverse trigonometric functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
Y. Use the method of completing the square to integrate a function	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
Z. Review the basic integration formulas involving elementary functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
AA. Develop properties of hyperbolic functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
BB. Differentiate and integrate hyperbolic functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
CC. Develop properties of inverse hyperbolic functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
DD. Differentiate and integrate functions involving inverse hyperbolic functions	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
VII. Applications of Integration		
A. Find the area of a region between two curves using integration	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
B. Find the area of a region between intersecting curves using integration	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
C. Describe integration as a accumulation process	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3
D. Find the volume of	Numbers & Operations	1.1, 1.2, 2.1, 2.2, 5.1,

a solid of revolution using the disk method	Algebra Measurement	5.2
E. Find the volume of a solid of revolution using the washer method	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
F. Find the volume of a solid with known cross sections	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
G. Find the volume of a solid of revolution using the shell method	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 5.1, 5.2
H. Compare the uses of the disk method and the shell method	Numbers & Operations Algebra Measurement	1.1, 1.2, 2.1, 2.2, 2.3, 3.3, 4.2, 5.1, 5.2, 5.3

References and Resources

Referenced Standards

Principles and Standards for School Mathematics (4th ed.). (2005). National Council of Teachers of Mathematics, Reston, VA

Oklahoma Priority Academic Student Skills (2003). Oklahoma State Department of Education-PASS-{www.sde.state.ok.us}

Suggested Text and Supplemental Materials

Larson, Ron, Hostetler, Bob, Edwards, Bruce. (2006). *Calculus with Analytic Geometry (8th ed)/ Calculus of a Single Variable (8th ed)*. Boston: Houghton Mifflin.

Larson, Ron, Hostetler, Bob, Edwards, Bruce. (2006). *Calculus with Analytic Geometry (8th ed)/ Calculus of a Single Variable (8th ed)- Instructor's Resource Guide*. Boston: Houghton Mifflin.

Varberg, Dale, Edwin J. Purcell, and Steven E. Rigdon. (2007). *Calculus (9th ed.)*. Boston: Pearson Prentice Hall.

Thomas, George B., Jr., and Ross L. Finney (1996). *Calculus with Analytic Geometry (9th ed.)*. Boston: Addison-Wesley.

Finney, Ross L., Franklin D. Demana, Bert K. Waits, and Daniel Kennedy. (2007). *Calculus: Graphical, Numerical, Algebraic: AP Edition (3rd ed.)*. Boston: Pearson Prentice Hall.