

CALCULUS II
GRADE LEVEL 12

#	Lesson	Lesson Content
1	Definite Integrals	Definition of integral, discussion of finding integrals, notations for integrals, discussion of definite integrals
2	Fundamental Theorem	Implications of the fundamental theorem of calculus, evaluating definite integrals, addition property
3	Indefinite Integrals	The integral as a function; antiderivatives, integrating a constant multiple of a function
4	Integrals by Substitution	Inverse of the chain rule, determining u and du , integrals of the squares of sine and cosine; substitution for definite integrals/change limits
5	Natural Logarithms	Definition of natural logarithm as an integral; review of laws of logarithms; derivatives of natural logarithms; finding the integral of tangent using logarithms
6	Area Between Two Graphs	Discussion of implications of areas between graphs; points of intersection for region; comparing functions for subtraction direction
7	Integral Unit Review	Review of integrals, antiderivatives, chain rule, logarithms, laws of logarithms, and other material covered in previous lessons
8	Volumes 1	Volumes of rotation of $F(x)$ about the x -axis; the disc method; the washer method (two functions)
9	Volumes 2	Volumes of rotation $F(x)$ about the y -axis; the shell method, the shell method with two functions
10	Arclength	Definition and examples of arclength, finding the length of a curve
11	Surface Area	Finding the area of a rotational surface
12	Work	Definition of work; finding work with a variable force; work to empty a tank
13	Application Unit Review	Review of volumes, surface area, work, and hydrostatic force
14	Exponent Function	The natural exponent function; inverse of the natural logarithm; laws of exponents; derivative of the natural exponent; integral of the natural exponent
15	Exponents and Logarithms	Exponential and logarithmic functions of other bases; rewriting exponentials with the natural exponential; derivative of general exponential functions; logarithms of different bases; derivative of general logarithms
16	Growth and Decay	Exponential growth and decay; function of exponential growth and decay; half-lives and doubling times
17	Inverse Trig Functions	Arcsine and arccosine; arctangent and arccotangent; arcsecant and arccosecant; derivatives and integrals of all six functions
18	Inverse Functions Review	Review of exponents, logarithms, and inverse trig functions
19	Integration by Parts	Breaking up the function to be integrated; n th powers of sine and cosine
20	Trigonometric Integrals	Integrals involving trigonometric functions; products of sines and cosines; products of tangents and secants; changing to sines and cosines; using trig identities
21	Trig Substitutions	Substitution trig functions in for x ' forms containing square roots and x squared
22	Partial Fractions	Preparing the fraction; division; factoring; breaking the fraction into its component parts
23	Approximations	Using trapezoidal rule to approximate area; using Simpson's rule to

		approximate area
24	Improper Integrals	Unbounded integrands; unbounded intervals; convergent or divergent integrals
25	Techniques Unit Review	Review of previous material
26	Comprehensive Exam	