

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Unit 1: Absolute Value

Class Day
2 I can translate between a number line graph, an inequality, and interval notation.

Class Day
2 I can translate between absolute value expressions and English statements about numbers on the number line.

Class Day
2 I can solve equations and inequalities involving absolute value by translating the equations or inequalities first into “suto math” and then into an English sentence about numbers on the number line.

Class Day
4 I can determine the length of a segment connecting two points in the cartesian plane.

Class Day
4 I can draw segments to represent specified lengths by connecting integer valued points in the plane.

Class Day
4 I can draw and find the equation of a circle when given the locations where the circle intersects axes, a points through which the circle passes, or the endpoints of the diameter of the circle.

Class Day
4 I can determine where a circle intersects an axis when given the equation of a circle, completing the square when necessary.

Class Day
4 I can determine the equation of a line tangent to a circle given the equation of the circle in various forms and the point of tangency.

Unit 2: Functions

Class Day
6 I can evaluate a function given a numeric value or another function

Class Day
6 I can write an algebraic formula for a function described in English.

Class Day
6 I can determine if a graph, table of values, map diagram, or equation represents a function.

Class Day
6 I can determine the domain of a function algebraically.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
6 I can create a function to represent a situation.

Class Day
7 I can evaluate a function given a numeric value or another function

Class Day
8 I can find the composition of two functions.

Class Day
8 I can create a function to represent a situation involving area, perimeter, or volume.

Class Day
8 I can use interval notation to describe the domain and range of a function (which may or may not be continuous) given the graph of the function.

Class Day
8 I can identify expression involving a function as distances on a graph of the function and vice versa.

Class Day
8 I can determine if the graph of a function is symmetric about the x-axis, y-axis, or origin.

Class Day
8 I can determine if a function is odd or even when given the equation or the graph representing the function.

Class Day
11 I can create a graph to represent the speed of a roller coaster car as a function of how far it has moved down the track when given a picture of the roller coaster track.

Unit 3: Inverse Functions

Class Day
15 I can write an English sentence to describe what happens to a value when it is used as the input to a function.

Class Day
15 I can write an English sentence to describe what happens to an output value of a function in order to “work it backwards” through the function.

Class Day
15 I can evaluate a function for specific values when given the graph of the function.

Class Day
15 I can create the graph of the inverse of a function using values from the original function when given the graph of the original function.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
15

I can create a graph of the inverse of a function using the fact that inverse functions are reflections across the line $y = x$.

Class Day
15

I can create a rule for the inverse of a function and express this rule using function notation.

Class Day
16

I can create a “function flow diagram” to represent a function described in words or using algebra.

Class Day
16

I can create a function flow diagram to represent undoing another function flow diagram.

Class Day
16

I can evaluate a function for specific values when given the graph of the function.

Unit 4: Transforming Functions

Class Day
18

I can predict how the graph of a function will change as the result of changes to the equation that represents the function.

Unit 5: Optimization

Class Day
25

I can create a function to represent a situation.

Class Day
25

I can use a graphing calculator to find the optimal solution to a problem.

Unit 6: Roots of Polynomials

Class Day
27

I can use a graphing calculator to locate x-intercepts of a polynomial.

Class Day
27

I can use the x-intercepts to express a polynomial as the product of irreducible factors.

Class Day
27

I can use long division to find factors of a polynomial.

Class Day
30

I can determine if a graph could represent a polynomial function.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
30 I can determine a lower bound on the degree of a polynomial by examining its graph.

Class Day
30 I can determine if the degree of a polynomial is odd or even and if the leading coefficient is positive or negative by examining its graph.

Class Day
30 I can determine if a given value is a zero of given polynomial when given a graph or the equation of the function.

Class Day
30 I can given polynomial equation could be represented by a particular graph.

Class Day
30 I can determine if a given polynomial could be a factor of another polynomial without using long division or graphing.

Class Day
30 I can use a graph and long division to completely factor a polynomial (that is, to write the polynomial as a product of irreducible factors).

Class Day
30 I can create a polynomial function to match descriptions involving the degree and the roots of the polynomial.

Class Day
30 I can find a possible equation for a polynomial function when given its graph.

Class Day
31 I can determine if the degree of a polynomial is odd or even and if the leading coefficient is positive or negative by examining its graph.

Class Day
31 I can create a polynomial function to match descriptions involving the degree and the roots of the polynomial.

Class Day
33 I can simplify expressions involving negative exponents.

Class Day
33 I can solve equations involving exponents.

Class Day
33 I can apply what I have learned about factoring quadratic expressions to situations involving exponents.

Unit 7: Exponents and Logarithms

Class Day
34 I can describe why a given situation would or would not represent exponential growth.

Class Day
34 I can give an example of a situation where exponential growth would arise.

Class Day
34 I can explain what it means for growth to be exponential.

Class Day
34 I can create, and use, a function to model exponential growth or decay.

Class Day
34 I can explain the difference between exponential growth and exponential decay.

Class Day
34 I can create, and use, a function to model exponential decay.

Class Day
35 I can explain the meaning of the number e in terms of exponential growth

Class Day
36 I can explain the meaning of a logarithm in both mathematical terms and real world situations.

Class Day
36 I can solve problems which involve logarithms by translating them into exponent problems.

Class Day
42 I can justify and use the multiplication property of logarithms.

Class Day
42 I can justify and use the division property of logarithms.

Class Day
42 I can justify and use the power property of logarithms.

Class Day
43 I can justify and use the multiplication property of logarithms.

Class Day
43 I can justify and use the division property of logarithms.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
43 I can justify and use the power property of logarithms.

Class Day
44 I can justify and use the multiplication property of logarithms.

Class Day
44 I can justify and use the division property of logarithms.

Class Day
44 I can justify and use the power property of logarithms.

Unit 8: Circular Functions

Class Day
46 I can explain what a radian is.

Class Day
46 I can give a mathematical reason for why radians are “better” than degrees.

Class Day
46 I can find the location of a point on the circumference of a circle resulting from a rotation about the center of the circle using radians.

Class Day
46 I can determine the quadrant that a point on the circumference of a circle will end up in as the result of a rotation about the center given in radian.

Class Day
46 I can determine the measure of coterminal angles.

Class Day
50 If I know the location of the point of intersection of the terminal side of an angle, then I can find the location of the point of intersection of the terminal side of “family members” of this angle by thinking geometrically.

Class Day
53 I can translate between what I have learned about circular functions and the definition of the sine and the cosine of a central angle.

Class Day
55 I can simplify an expression involving trigonometric functions.

Class Day
55 I can verify that a trigonometric equation is an identity by using a graphing calculator.

Class Day
55 I can prove that a trigonometric equation is an identity by using algebra.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
55 I can solve trigonometric equations including ones which require substitution.

Class Day
60 I can translate between mathematical notation and English with regards to trigonometric functions and their inverses.

Class Day
61 I can work with trigonometric expressions and equations involving the sum or difference of arguments.

Class Day
66 I can determine the transformations needed to change the graph of one function into another.

Class Day
66 I can deduce the necessary graphical translations needed to change the graph of a sine or cosine function into a graph which will accurately represent a situation.

Unit 9: Calculus Overview

Class Day
70 I can use a graphing calculator to examine what is happening to a function on a very small scale.

Class Day
70 I can determine what is happening in a situation by examining a graph.

Class Day
70 I can sketch a graph to represent the relationship between variables.

Class Day
72 I can explain the meaning of “definite integral”.

Class Day
72 I can estimate the value of a definite integral by using rectangles (left, middle, or right) or by using trapezoids.

Class Day
72 I can determine if a situation calls for finding a definite integral.

Class Day
72 I can interpret the meaning of the definite integral using its units of measure to help.

Unit 10: Polar Coordinates

Class Day
75 I can plot points on a polar graph.

Key Skills

Course
Intro to Calculus

School Year
2008/2009

Class Day
75 I can write an equation for a polar graph.

Class Day
77 I can convert polar coordinates and equations into rectangular coordinates and equations.

Class Day
78 I can convert polar coordinates into rectangular coordinates.

Class Day
78 I can convert rectangular coordinates into polar coordinates.

Class Day
78 I can convert a polar equation into a rectangular (Cartesian) equation.

Unit 11: Limits

Class Day
80 I can explain the meaning of a limit of a function.

Class Day
80 I can determine the limit of a function using a graph, a table of values, or algebra.

Class Day
83 I can evaluate the limit of a function which involves the x -value approaching infinity.

Class Day
86 I can explain what it means for a function to be continuous.

Class Day
86 I can determine if a function is continuous at a point.

Class Day
86 I can determine if a function is continuous on the domain in which it is defined.

Class Day
86 I can explain the Intermediate Value Theorem.

Class Day
86 I can use the Intermediate Value Theorem to solve problems.
