

MATH 30-1 Mathematics 30-1

5 credits, 6 hours lecture

Course Description

Topics covered include the unit circle; graph, analyze and solve problems using the three primary trigonometric functions for angles expressed in radians and degrees; solve first degree trigonometric equations; prove trigonometric identities; perform operations on and composition of functions; analyze and perform translations on graphs of functions and related equations; logarithms; graph, analyze and solve polynomial functions; permutations, combinations and binomial theorem.

Alberta Education Course Equivalency: Math 30-1

Pre and Co-requisites

Prerequisite: MATH 20-1 or MATH 30-2 or permission from the Program Chair

Course Learning Outcomes (CLOs)

Upon successful completion of the course, the student shall be able to:

CLO1 Function Transformations

- Determine the effects of h and k in $y = f(x-h) + k$ on the graph of $y = f(x)$
- Sketch the graph of $y = f(x-h) + k$ for given values of h and k , given the graph of $y = f(x)$
- Write the equation of a function whose graph is a vertical and/or horizontal translation of the graph of $y = f(x)$
- Develop an understanding of the effects of vertical and horizontal stretches on the graphs of functions and their related equations
- Develop an understanding of the effects of reflections on the graphs of functions and their related equations; including reflections through x axis, y axis and the line $y = x$
- Sketch the graph of a transformed function by applying translations, reflections and stretches
- Write the equation of a function that has been transformed from the function $y = f(x)$
- Sketch the graph of the inverse of a relation
- Determine if a relation and its inverse are functions
- Determine the equation of an inverse

CLO2 Exponential Functions

- Analyze graphs of exponential functions
- Solve problems that involve exponential growth or decay.
- Apply translations, stretches and reflections to the graphs of exponential functions
- Represent these transformations in the equations of exponential functions
- Solving exponential equations

CLO 3 Logarithmic Solve Functions

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- Demonstrate that a logarithmic function is the inverse of an exponential function
- Sketch and determine the characteristics of the graph $y = \log_c x$, $c > 0$, $C \neq 1$ • Express a logarithmic function as an exponential function and vice versa
- Evaluate logarithm using a variety of methods
- Explain the effects of the parameters a , b , h and k in $y = a \log_c (b(x-h)) + k$ on the graph of $Y = \log_c x$
- Sketch the graph of a logarithmic function by applying a set of transformations to the graph of $y = \log_c x$
- Demonstrate an understanding of the product, quotient and power laws of logarithms. Determine the equivalent form of a logarithmic expression using the laws of logarithms
- Solve problems that involve logarithmic equations

CLO4 Trigonometry

- Demonstrate an understanding of angles in standard position, expressed in degrees and radians.
- Solve problem involving arc lengths, central angles and the radius in a circle.
- Develop and apply the equation of the unit circle
- Solve problems using the six trigonometric ratios for angles expressed in radians and degrees.
- Solve algebraically and graphically, first and second degree trigonometric equations with the domain expressed in radians and degrees
- Graph and analyze the trigonometric functions sine, cosine and tangent to solve problems.
- Prove trigonometric identities using reciprocal, quotient, Pythagorean identities, sum or difference identities and double angle identities

CLO5 Relations and Functions

- Demonstrate an understanding of operations on, and compositions of, functions
- Demonstrate an understanding of factoring polynomial of degree greater than 2 (limited to polynomials of degree ≤ 5 with integral coefficients.
- Graph and analyze polynomial functions (limited to polynomial functions of degree ≤ 5)
- Graph and analyze radical functions (limited to functions involving one radical)
- Graph and analyze rational functions (limited to numerators and denominators that are monomials, binomials or trinomials)

CLO6 Permutations, Combinations and Binomial Theorem

- Apply the fundamental counting principle to solve problems
- Determine the number of permutations of ' n ' elements taken ' r ' at a time to solve problems
- Determine the number of combinations of ' n ' different elements taken ' r ' at a time to solve problems.
- Expand powers of a binomial using binomial theorem and Pascal triangle

Evaluation

Assessment Type	Percentage
Unit Assignments	10%
Mid Term 1	25%
Mid Term 2	25%
Final Exam	40%
Total	100%

General course evaluation (Assignments %, Tests %, Exams %). This is the overarching evaluation scheme. The course syllabus will provide the details on how each category will be assessed, e.g., how many tests there are and the weight of each test. Not all assessments need to be used in the course.

Course Completion Requirements

A grade of 60% (1.7, or C-) is required for progression. The minimum standard for passing this course is a grade of 50% (1.0, or D).

Grading Scale

4.0 Grade Scale	Alpha Grade	Percentage Grade
4.0	A+	93-100
4.0	A	85-92.9
3.7	A-	80-84.9
3.3	B+	77-79.9
3.0	B	74-76.9
2.7	B-	70-73.9
2.3	C+	67-69.9
2.0	C	64-66.9
1.7	C-	60-63.9
1.3	D+	55-59.9
1.0	*D	50-54.9
0.0	F	0-49.9

Land Acknowledgement

We respectfully acknowledge that Keyano College is on Treaty No. 8 Territory, the ancestral and traditional territory of the Cree, Dene, and Métis people.

Review Date: March 4, 2024

Every effort has been made to ensure that information in this course outline is accurate at the time of publication. Keyano College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.

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