

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 $y - k = f(x - h)$ on the graph of $y = f(x)$
- Sketch the graph of $y - k = f(x - h)$ 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

- 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
Assignments	15%
Quizzes	20%
Mid Term	25%
Final Exam	40%
Total	100%

Course Completion Requirements

Minimum passing mark of 50% or D is required.

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.

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