MATH 1710 Course Topics & Learning Outcomes

Topics

Numbers, Data, and Problem Solving
Visualization of Data
Functions and Their Representations
Types of Functions and Their Rates of Change

I. Learning Outcomes

1. Students will demonstrate the ability to classify numbers and to interpret data presented in visual or numeric forms.
2. Students will demonstrate the ability to convert numbers between standard and scientific notation, and to use scientific notation in numerical computations.
3. Students will demonstrate the ability to extrapolate necessary data and information from given application problems and to use this data and the processes of problem solving to successfully determine solutions.
4. Students will demonstrate the ability to distinguish corresponding sets as representations of relations or functions by the analysis of graphical, numeric, or symbolic data.
5. Students will demonstrate the ability to identify types of functions and to determine the domain, range, and average rate of change from their graphical, numeric, and symbolic representations.

Topics

Linear Functions and Models
Equations of Lines
Linear Equations
Linear Inequalities
Piece-wise Defined Linear Functions
Linear Approximation

II. Learning Outcomes

1. Students will demonstrate the ability to solve linear equations, inequalities, and compound inequalities, and to represent solutions in set, interval, and graphical notations.
2. Students will demonstrate the ability to solve absolute value equations and inequalities.
3. Students will demonstrate the ability to graph linear functions and vertical lines, and to determine intercept(s) and slope.
4. Students will demonstrate the ability to write the equation of a linear function given the slope and a point on the line or given the slope and a parallel or perpendicular line.
5. Students will demonstrate the ability to graph a scatter plot of given points and to use regression to approximate a linear model.
6. Students will demonstrate the ability to evaluate and graph piece-wise defined linear functions.

Topics

Quadratic Functions and Models
Quadratic Equations and Problem Solving
Transformations of Graphs

III. Learning Outcomes

1. Students will demonstrate the ability to use factoring, the square root property, and the quadratic formula to solve quadratic equations.
2. Students will demonstrate the ability to use the discriminant and graphical representations to determine types of solutions for quadratic equations.
3. Students will demonstrate the ability to solve applications and model data involving quadratic equations.
4. Students will demonstrate the ability to determine maxima and minima of quadratic functions using a graphing calculator.
5. Students will demonstrate the ability to graph quadratic functions, to identify the vertex and axis of symmetry, and to convert between standard and vertex forms of a function.
6. Students will demonstrate the ability to solve quadratic inequalities graphically and symbolically.
7. Students will demonstrate the ability to use vertical and horizontal shifts and vertical stretching and shrinking in transformations of graphs.

Topics

Polynomial Functions and Models
Rational Functions and Models

IV. Learning Outcomes

1. Students will demonstrate the ability to understand and interpret data from the graphs of polynomial functions.
2. Students will demonstrate the ability to identify the domain of a rational function.
3. Students will demonstrate the ability to determine vertical and horizontal asymptotes of the graphs of rational functions.

Topics

Combining Functions
Inverse Functions and Their Representations
Exponential Functions and Models
Logarithmic Functions and Models
Properties of Logarithms
Exponential and Logarithmic Equations
Functions and Equations of Two Variables

V. Learning Outcomes

1. Students will demonstrate the ability to perform arithmetic operations and compositions of functions using graphical, numeric, and symbolic representations.
2. Students will demonstrate the ability to identify one-to-one functions and find inverse functions symbolically.
3. Students will demonstrate the ability to determine the domains and ranges of inverse functions and to graph inverse functions and their line of symmetry.
4. Students will demonstrate the ability to distinguish between linear and exponential functions and to distinguish between exponential growth and decay.
5. Students will demonstrate the ability to calculate compound interest and to use exponential models to represent growth and decay.
6. Students will demonstrate the ability to calculate logarithms.
7. Students will demonstrate the ability to solve logarithmic and exponential equations.
8. Students will demonstrate the ability to apply basic properties of logarithms and to use the change of base formula.

Topics

Linear Systems of Equations and Inequalities in Two Variables
Properties and Applications of Matrices
Solutions of Linear systems Using Matrices
Inverses of Matrices
Determinants

VI. Learning Outcomes

1. Students will demonstrate the ability to solve systems of equations and inequalities graphically.
2. Students will demonstrate the ability to solve systems of linear equations by substitution and elimination.
3. Students will demonstrate the ability to determine dimensions of matrices and to determine if a matrix is in row-echelon form.
4. Students will demonstrate the ability to find sums, differences, and scalar multiples of matrices and to determine when matrices may be multiplied and to perform matrix multiplication.
5. Students will demonstrate the ability to represent systems of linear equations with matrices and to use matrices and technology to solve systems.
6. Students will demonstrate the ability to solve applications using systems of equations.
7. Students will demonstrate the ability to use technology to find inverses of matrices and to solve linear systems with inverses.
8. Students will demonstrate the ability to use technology to find determinants.

Topics

Counting
Probability

VII. Learning Outcomes

1. Students will demonstrate the ability to apply the fundamental counting principle.
2. Students will demonstrate the ability to calculate and apply permutations and combinations.
3. Students will demonstrate the ability to calculate the probability of independent, dependent, and compound events.