LSU College Readiness Dual Enrollment Program for Math

COURSE PROFILE

6-10-24

**COURSE NAME: Math 1021 College Algebra**

**HIGH SCHOOL COURSE CODE: 160500**

**BOARD OF REGENTS COMMON COURSE NUMBER: CMAT 1213 College Algebra**

**PRIMARY ONLINE CONTENT SOURCE: *Algebra & Trigonometry with Interactive Assessments, 4e,* *MyLab Math*, Kirk Trigsted**

**COURSE/UNIT CREDIT: 3 credit hours, 1 Carnegie Unit**

**GRADE(S): 10, 11, or 12**

**PREREQUISITE(S): MACT min 19**

**CHAPTERS**

**1 – Equations, Inequalities, and Applications**

**2 – The Rectangular Coordinate System, Lines, and Circles**

**3 – Functions**

**4 – Polynomial and Rational Functions**

**5 – Exponential and Logarithmic Functions and Equations**

**12 – Systems of Equations**

| **SECTION NAMES (NUMBER OF EXERCISES) AND LEARNING OBJECTIVES** |
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| **CHAPTER 1: Equations, Inequalities, and Applications** |
| **1.1 Linear and Rational Equations (67)**  Determine whether equations are linear or nonlinear  Solve linear equations with integer coefficients  Solve linear equations involving fractions  Solve linear equations involving decimals  Identify rational equations  Solve rational equations that lead to linear equations |
| **1.4 Quadratic Equations (62)**  Solve quadratic equations by factoring  Solve quadratic equations using the square root property  Solve quadratic equations using the quadratic formula  Use the discriminant to determine the type of solutions of a quadratic equation |
| **1.6 Other Types of Equations (58)**  Solve higher-order polynomial equations  Solve equations that are quadratic in form  Solve equations involving single radicals |
| **1.7 Linear Inequalities (39)**  Solve linear inequalities in one variable  Solve three-part inequalities in one variable |
| **1.8 Absolute Value Equations and Inequalities (16)**  Solve absolute value equations |
| **CHAPTER 2: The Rectangular Coordinate System, Lines, and Circles** |
| **2.1 The Rectangular Coordinate System (29)**  Plot ordered pairs  Determine if an ordered pair lies on a graph  Find intercepts of graphs from equations  Find the midpoint of a line segment using the midpoint formula  Find the distance between two points using the distance formula |
| **2.2 Circles (42)**  Write the standard form of an equation of a circle  Find the center, radius, and intercepts and sketch the graph of circles given equations in standard form  Find the center, radius, and intercepts and sketch the graph of circles given equations in general form |
| **2.3 Lines (60)**  Find the slopes of lines that pass through two given points  Sketch the graph of a line given a point and the slope  Find the equation of a line in point-slope form  Find the equation of a line in slope-intercept form  Find the equation of a line in standard form  Find the slope and the y-intercept of a line in standard form and sketch the graph  Sketch the graphs of lines given in standard form by plotting intercepts  Find equations of horizontal lines and vertical lines |
| **2.4 Parallel and Perpendicular Lines (39)**  Determine whether two lines are parallel, perpendicular, or neither  Find the equations of lines parallel to given lines  Find the equations of lines perpendicular to given lines |
| **CHAPTER 3: Functions** |
| **3.1 Relations and Functions (65)**  Find the domain and range of relations, and determine if relations represent functions  Determine whether equations represent functions  Use function notation to identify points that lie on graphs of functions  Evaluate functions at given values  Determine difference quotients  Use the vertical line test to determine if graphs represent functions  Classify functions as polynomials, rational functions, or root functions, and find their domains |
| **3.2 Properties of a Function’s Graph (54)**  Determine the intercepts of a function  Determine the domain and range of functions from their graphs  Determine where functions are increasing, decreasing, or constant  Determine relative maximum and relative minimum values of a function  Determine whether a function is even, odd, or neither  Use graphs to evaluate or compare functions  Identify function properties from graphs |
| **3.3 Graphs of Basic Functions; Piecewise Functions (41)**  Sketch the graphs of the basic functions  Sketch graphs of basic functions with restricted domains  Determine functions and their domains from graphs of piecewise-defined functions  Graph and determine properties of piecewise-defined functions |
| **3.4 Transformations of Functions (54)**  Use vertical shifts to graph functions  Use horizontal shifts to graph functions  Use reflections to graph functions  Use vertical stretches and compressions to graph functions  Use combinations of transformations to graph functions  Use transformations to sketch the graphs of piecewise-defined functions |
| **3.5 Composite Functions (23)**  Find composite functions  Evaluate composite functions at a given point |
| **3.6 One-to-One Functions; Inverse Functions (46)**  Determine if functions are one-to-one  Determine whether a function is one-to-one using the horizontal line test  Determine if functions are inverses of one another  Find inverses of one-to-one functions  Sketch the graphs of inverse functions  Use the graph of a function to determine properties of its inverse |
| **CHAPTER 4: Polynomial and Rational Functions** |
| **4.1 Quadratic Functions (39)**  Determine whether the graph of a quadratic function opens up or down  Determine properties of quadratic function in vertex form and graph the function  Determine properties of quadratic function using the vertex formula and graph the function  Determine the equation of a quadratic function given its graph |
| **4.2 Applications of Quadratic Functions (14)**  Solve applications involving the maximum of projectile motion functions  Solve applications involving the maximum of functions in economics |
| **4.3 Graphs of Polynomial Functions (47)**  Identify polynomial functions and their degree, leading coefficient, and constant term  Sketch the graphs of power functions using transformations  Use the end behavior of polynomial functions to describe the equation of the function  Determine the intercepts of a polynomial function  Determine the real zeros of polynomial functions and their multiplicities  Sketch the graph of a polynomial function using the four-step process  Determine a possible equation of a polynomial function given its graph |
| **4.6 Rational Functions and Their Graphs (40)**  Find the domain and intercepts of rational functions  Identify vertical asymptotes of rational functions  Identify horizontal asymptotes of rational functions  Use transformations to sketch the graphs of rational functions  Find removable discontinuities, intercepts, and asymptotes and sketch graphs of rational functions |
| **CHAPTER 5: Exponential and Logarithmic Functions and Equations** |
| **5.1 Exponential Functions (62)**  Evaluate exponential expressions  Sketch the graphs of exponential functions  Determine possible equations of exponential functions given their graphs  Sketch the graphs of exponential functions using transformations  Solve exponential equations by relating the bases  Solve applications involving exponential functions |
| **5.2 Logarithmic Functions (62)**  Change equations between exponential form and logarithmic form  Evaluate logarithmic expressions  Use properties of logarithms to evaluate expressions  Use common and natural logarithms  Sketch the graphs of logarithmic functions  Find the domain of logarithmic functions |
| **5.3 Properties of Logarithms (40)**  Expand and evaluate logarithmic expressions using properties of logarithms  Condense and evaluate logarithmic expressions using properties of logarithms  Solve logarithmic equations using the logarithm property of equality  Use the change of base formula to approximate logarithmic expressions  Use the change of base formula to solve logarithmic equations |
| **5.4 Exponential and Logarithmic Equations (48)**  Solve exponential equations  Solve logarithmic equations |
| **5.5 Applications of Exponential and Logarithmic Functions (19)**  Solve applications involving compound interest  Solve exponential growth and decay applications |
| **CHAPTER 12: Systems of Equations** |
| **12.1 Systems of Linear Equations in Two Variables (20)**  Determine whether ordered pairs are solutions to systems of linear equations in two variables  Solve systems of linear equations using the substitution method  Solve systems of linear equations using the elimination method  Solve systems of linear equations in two variables using either method  Solve applications using a system of linear equations |