LSU Dual Enrollment Program for Math

COURSE PROFILE

Content Revised 4-17-2018

**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, 3e,* *MyMathLab*, Kirk Trigsted**

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

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

**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 (51)**  Recognize linear equations  Solve linear equations with integer coefficients  Solve linear equations involving fractions  Solve linear equations involving decimals  Recognize rational equations  Solve rational equations that lead to linear equations |
| **1.4 Quadratic Equations (44)**  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 (40)**  Solve higher-order polynomial equations  Solve equations that are quadratic in form  Solve equations involving single radicals |
| **1.7 Linear Inequalities (26)**  Solve linear inequalities in one variable  Solve three-part inequalities in one variable |
| **1.8 Absolute Value Equations and Inequalities (35)**  Solve absolute value equations  Solve absolute value “less than” inequalities  Solve absolute value “greater than” inequalities |
| **CHAPTER 2: The Rectangular Coordinate System, Lines, and Circles** |
| **2.1 The Rectangular Coordinate System (28)**  Plot ordered pairs  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 (36)**  Write the standard form of an equation of a circle  Find the center, radius, intercepts, and sketch the graph of circles given equations in standard form  Find the center, radius, intercepts, and sketch the graph of circles given equations in general form |
| **2.3 Lines (55)**  Determine the slopes of lines through two given points  Sketch lines given a point and the slope  Find the equation of a line using the point-slope form  Find the equation of a line using the slope-intercept form  Find the equation of a horizontal line and a vertical line  Write the equation of a line in standard form  Find the slope and the y-intercept of a line in standard form  Sketch lines by plotting intercepts  Sketch a line given its equation in standard form |
| **2.4 Parallel and Perpendicular Lines (38)**  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 (62)**  Find the domain and range of relations, and determine if relations represent functions  Determine whether equations represent functions  Use function notation and 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 (47)**  Determine the intercepts of a function  Determine the domain and range of a function from its graph  Determine where functions are increasing, decreasing, or constant  Determine relative maximum and relative minimum values of a function  Determine whether a function if even, odd, or neither  Identify function properties from graphs |
| **3.3 Graphs of Basic Functions; Piecewise Functions (38)**  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 (51)**  Use vertical shifts to graph functions  Use horizontal shifts 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 (19)**  Find composite functions  Evaluate composite functions at a given point |
| **3.6 One-to-One Functions; Inverse Functions (44)**  Determine if functions are one-to-one  Determine whether a function is one-to-one using the horizontal line test  Verify functions are inverses of one another  Find inverses of one-to-one functions  Sketch the graphs of inverse functions  Use the graphs of functions to determine properties about its inverse |
| **CHAPTER 4: Polynomial and Rational Functions** |
| **4.1 Quadratic Functions (38)**  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 (10)**  Solve applications involving the maximum of projectile motion functions  Solve applications involving the maximum of functions in economics |
| **4.3 Graphs of Polynomial Functions (46)**  Identify polynomial functions and their degree, leading coefficient, and constant coefficient  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 (41)**  Find the domain and intercepts of rational functions  Identify vertical asymptotes  Identify horizontal asymptotes  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 (65)**  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 (61)**  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 (44)**  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 |
| **5.4 Exponential and Logarithmic Equations (43)**  Solve exponential equations  Solve logarithmic equations |
| **5.5 Applications of Exponential and Logarithmic Functions (16)**  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 (13)**  Verify solutions to a system 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 applied problems using a system of linear equation |