

# LSU Dual Enrollment Program for Math

## Math 1021 College Algebra COURSE PROFILE 6-10-2024

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

ETEXT: *Algebra & Trigonometry with Interactive Assessments, 4e, MyLab Math*, Kirk Trigsted

HIGH SCHOOL COURSE CODE: 160500

### 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**

*The number in parentheses indicates the number of homework exercises on that topic in MyLab Math.*

## Chapter 1: Equations, Inequalities, and Applications

### Section 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

### Section 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

### Section 1.6 Other Types of Equations (58)

Solve higher-order polynomial equations

Solve equations that are quadratic in form

Solve equations involving single radicals

### Section 1.7 Linear Inequalities (39)

Solve linear inequalities in one variable

Solve three-part inequalities in one variable

### Section 1.8 Absolute Value Equations and Inequalities (16)

Solve absolute value equations

## **Chapter 2: The Rectangular Coordinate System, Lines, and Circles**

### **Section 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

### **Section 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

### **Section 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

### **Section 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**

### **Section 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

### **Section 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

### **Section 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

### **Section 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

### **Section 3.5 Composite Functions (23)**

Find composite functions

Evaluate composite functions at a given point

### **Section 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**

### **Section 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

### **Section 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

### **Section 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

## **Section 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**

### **Section 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

### **Section 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

### **Section 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

### **Section 5.4 Exponential and Logarithmic Equations (48)**

- Solve exponential equations
- Solve logarithmic equations

### **Section 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**

### **Section 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