

This course covers the algebra necessary for successful completion of the Precalculus/Calculus sequence while introducing functions, graphing, and graphing utilities. Topics include the operation and use of graphing utilities, polynomial operations and functions, absolute value equations and functions, radical and rational exponent functions, piecewise functions, composite functions, and complex numbers. Prerequisite: Waiver by placement testing results; or department approval.

COURSE OUTCOMES	OUTCOMES ACTIVITIES
A student will be able to	
Use the built-in graphing capabilities of a graphing calculator in order to graph and analyze functions introduced in this course and in other mathematics and related courses.	<ol style="list-style-type: none"> 1. Graph functions. (CT,TS) 2. Adjust the graphing window to obtain a complete graph. (TS,CT) 3. Use ZOOM and TRACE appropriately. (TS,CT) 4. Use TABLE and TBLSET appropriately. (TS,CT) 5. Use other features such as 'zero', 'minimum', 'maximum', and 'intersect' appropriately. (TS,CT) 6. Use SOLVE appropriately. (TS,CT)
Perform operations on polynomials in order to have the skills necessary to analyze and solve problems involving polynomials and polynomial functions.	<ol style="list-style-type: none"> 1. Review addition, subtraction, and multiplication of polynomials. (CT,QS) 2. Divide polynomials, including polynomial long division. (CT,QS) 3. OPTIONAL: Divide polynomials using synthetic division. (CT,QS) 4. Solve polynomial equations and inequalities. (CT,QS) 5. Convert between interval notation, inequalities, and number line graphs. (CT,QS) 6. OPTIONAL: Apply the Remainder Theorem and the Rational Root Theorem. (CT,QS)
Apply formulas from analytic geometry and solve various types of equations in order to use these skills to solve related problems as they are introduced in this course and other mathematics and related courses.	<ol style="list-style-type: none"> 1. Solve absolute value equations and inequalities. (CT,QS) 2. Solve radical equations and rational exponent equations. (CT,QS) 3. Apply the distance formula. (CT,QS) 4. Apply the midpoint formula. (CT,QS)
Solve problems involving circles in order to apply the technique of completing the square and to demonstrate facility in transferring knowledge back and forth between graphical and analytical.	<ol style="list-style-type: none"> 1. Find an equation of a circle. (CT,QS) 2. Graph circles by hand and by using a graphing utility. (CT,QS, TS) 3. Find the center and radius of a circle given the equation in standard form. (CT,QS) 4. Find the center and radius of a circle given the equation in general form by completing the square. (CT,QS)
Demonstrate knowledge of the basic properties of functions in order to apply this knowledge to analyze and graph different types of functions as they are introduced in this course and other mathematics and related	<ol style="list-style-type: none"> 1. Determine if a relation is a function. (CT,QS) 2. Find the domain and range of a function. (CT,QS) 3. Find the intercepts of a function algebraically. (CT,QS) 4. Determine if the graph of a function is symmetric with respect to the y-axis or the origin. (CT,QS)

courses.	<ol style="list-style-type: none"> Determine if the graph of an equation is symmetric with respect to the x- axis. (CT, QS) Add, subtract, multiple, and divide functions and determine the domain of the resulting functions. (CT, QS) Evaluate the difference quotient for polynomial and radical functions. (CT, QS) Evaluate the composition of functions. (CT, QS) Use the graph of a function to identify domain and range, intervals of increase and decrease, relative extrema, and intercepts. (CT, QS, TS)
Analyze and graph polynomial functions (including linear and quadratic functions), absolute value functions, and radical and rational exponent functions in order to apply and expand upon these skills and knowledge in this course and other mathematics and related courses.	<ol style="list-style-type: none"> Graph and identify the graphs of a basic library of functions including <ol style="list-style-type: none"> $y = K$, $y = x^n$, $y = \sqrt{x}$, $y = x$, $y = \lfloor x \rfloor$ $y = \sqrt{r^2 - x^2}$. (CT, QS, TS) Use vertical and horizontal shifts, vertical and horizontal reflections, and vertical stretching and shrinking to graph functions. (CT, QS) Graph piecewise functions. (CT, QS) Graph and analyze the graphs of polynomial functions, absolute value functions, and radical and rational exponent functions. (CT, QS) Solve applied problems involving quadratic functions. (CT, QS, R)
Solve problems involving complex numbers in order to apply these skills in this course and other mathematics and related courses.	<ol style="list-style-type: none"> Add, subtract, multiply, and divide complex numbers. (CT, QS) Calculate powers of i. (CT, QS) Solve quadratic equations whose solutions are complex numbers. (CT, QS)
To strengthen Core Competencies** in order to increase success in this and other courses and in the workplace.	Referenced above

**Indicate the Core Competencies that apply to the outcomes activities and assessment tools: Critical Thinking (CT); Technology Skills (TS); Oral Communications (OC); Quantitative Skills (QS); Reading (R); Writing (W).