URBANDALE COMMUNITY SCHOOL DISTRICT

Course Title:	**Precalculus**

Description: Precalculus is designed to prepare students for a course in calculus at the college level. This course is for students who intend to continue their education in mathematics, engineering, science, or other math-related areas, or who are interested in learning mathematics as a part of their total education. A secondary purpose is to provide students not planning a math-related career with the mathematics they need to pass-out of required math courses at the college level. **Precalculus corresponds to MAT 129 in the DMACC course guide**. To qualify for the 5 hours of DMACC credit, a student must complete the full year class (fall and spring semesters) and register in the second semester with DMACC. *Trigonometry must be completed before or taken concurrently with first semester Pre-Calculus.

Reporting Topic	Course Level Standards	Competency Statement
Analyze and Evaluate Functions	• Describe a function • Determine if a relation is a function • Analyze the function to determine the domain and range of a function • Determine minimum and maximum values of a function • Analyze a function to determine whether functions are increasing, decreasing or constant • Categorize whether functions have even or odd properties • Examine and graph common functions (including piece-wise functions) • Compare and contrast transformations • Create functions using standard function operations • Describe an inverse function • Manipulate a one-to-one function to create an inverse function	Students will be able to analyze and evaluate functions
Evaluate Polynomial and Rational Functions	• Analyze a polynomial function and relate it to a real-world application • Rewrite a quadratic function in standard form • Find the vertex and any x-intercepts of a graph of a quadratic function • Determine real and complex zeros of a polynomial function • Utilize the fundamental Theorem of Algebra	Students will be able to analyze and use polynomial and rational functions

	• Apply the intermediate value, remainder, factor, and rational root theorems to find polynomial roots • Examine and graph polynomial functions • Interpret inequalities involving polynomial functions • Analyze a rational function • Determine horizontal/vertical/oblique asymptotes and any removable discontinuities • Examine and graph a rational function • Interpret inequalities involving rational functions	
Evaluate Exponential & Logarithmic Functions	• Analyze exponential functions • Examine and graph exponential functions • Solve exponential equations • Analyze logarithmic functions • Apply the properties of logarithms • Examine and graph logarithmic functions • Solve logarithmic equations • Apply exponential and logarithmic functions to problems involving interest, growth and decay	Students will be able to analyze and use exponential and logarithmic functions.
Establish, Assess, and Graph Trigonometric functions	• Determine sine, cosine, and tangent using the unit circle • Determine the reciprocal functions using the unit circle • Make sense of the eight fundamental identities • Use the fundamental identities to simplify trigonometric expressions	Students will be able to establish, assess, and graph trigonometric functions.

	• Evaluate trigonometric functions using the fundamental identities • Determine the values of trigonometric functions • Identify the signs of the trigonometric functions by quadrant • Interpret the generalized definition of the trigonometric functions • Evaluate the trigonometric functions given a point on the terminal side • Find the reference angle for any given triangle • Evaluate trigonometric functions of real numbers by table/calculator • List the exact values for the trigonometric functions pi/6, pi/4, pi/3, pi/2, pi • Analyze the trigonometric functions using a table/calculator • Determine the domain and range • Sketch the standard forms of the cosine, sine, tangent, secant, cosecant, and cotangent curves from memory • Graph by plotting points • Analyze and sketch trig functions using: amplitudes, periods, and phase shifts • Draw angles whose measures are given in degrees and radians • Determine a positive angle less than one revolution that is coterminal with a given angle • Use radian measure of angles • Convert degree measure to radian measure • Convert radian measure to degree measure • Define inverse trigonometric relations and functions • Evaluate inverse functions including domain and range • Use the right-triangle definition of the trigonometric functions • Solve mathematical and real-life right triangle problems • Apply the Law of Cosines to mathematical and real-life problems • Apply the Law of Sines to mathematical and real-life problemsE	

Investigate Identities and Solving Trigonometric Equations	• Apply half angle, double angle, and sum/difference trigonometric identities to write equivalent forms of expressions • Find exact values by using half angle, double angle, and sum/difference trigonometric identities • Solve linear and quadratic trigonometric equations • Solve quadratic trigonometric equations	Students will be able to investigate identities and solve trigonometric equations.
Solve Systems of Equations and Matrices	• Calculate and interpret solutions of linear systems • Perform partial fraction decomposition • Compute matrix solutions to linear systems using Gaussian elimination • Perform matrix operations • Calculate multiplicative inverses • Identify and solve matrix equations	Students will be able to solve systems of equations using a variety of methods.