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JOHNSON COUNTY COMMUNITY COLLEGE
Course Syllabus – College Now
Olathe South High School
Mathematics
Pre-Calculus
MATH 173

INSTRUCTOR INFORMATION:

Name: John Hail
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COURSE INFORMATION:

Credit: 5 hours
Lecture: 5 hours: Lab: 0 hours
Course Type: Transfer
Prerequisites: Grade of "C" or better in MATH 116 (Intermediate Algebra) or MATH 171 (College Algebra), COMPASS college algebra assessment score of 46 or higher or an ACT Math subscore of 26 or higher.

TEXTBOOK:

Pre-Calculus With Limits by Larson. Houghton Mifflin Company, Copyright 2016.
ISBN 13:978-1-305-11753-2

SUPPLIES:

TI-83 or TI-83 Plus or TI-84 Plus Calculator

CAVEATS:

The majority of mathematics courses are sequential. Students must earn a grade of "C" or higher in a prerequisite mathematics course to progress to its subsequent mathematics course.
In accordance with the assertion made on your billing statement, during the first two weeks of the semester, if a student is found not to have successfully fulfilled the prerequisite(s) for this course, the student will be dropped from the course. Additional information on the College Now program can be found at http://www.jccc.net/home/depts/1503.

COURSE DESCRIPTION:

MATH 173 is an accelerated course recommended for students with a strong high school math background (three to four years) who plan to take calculus. This course focuses on the study of functions and their graphs, solving equations and inequalities, recognition and creation of patterns, and the use of mathematical models. Included in the course are linear, power, polynomial, rational, radical, exponential, logarithmic, trigonometric, and absolute value functions.

COURSE OBJECTIVES:

Upon successful completion of this course the student should be able to:

1. Communicate algebraic and graphical information contained in mathematical models.
2. Identify and represent functions using words, data on a table, points on a graph, or a formula.
3. Identify appropriate domains and ranges.
4. Build and use piecewise functions, compose functions, combine functions, and create, use and interpret inverse functions.
5. Apply mathematical functions to model real world phenomena.
6. Solve problem situations that are represented using a description, a table of values, a graph, or a formula.
7. Demonstrate skills necessary to transition into Calculus.

CONTENT OUTLINE AND COMPETENCIES:

I. Concepts of Functions in Context
A. Interpret a problem solution in context of a situation.
B. Discuss appropriate notation for different contexts.
C. Label answers including units and possible description in context.
D. Calculate and interpret the average rate of change for a given problem situation.
E. Discuss the relationship between a function and its inverse.
F. Interpret an inverse function and inverse function values in context.

II. Elementary Functions
A. Determine whether a relation represented using words, a table of values, a graph, or a formula is a function.
B. Convert from one representation of a function to another.
C. Use function notation to symbolically represent functions.
D. Graph parent functions including linear, power, polynomial, rational, radical, exponential, logarithmic, trigonometric, and absolute value functions.
E. Apply the concepts of symmetry, intercepts, long-run behavior, periodic behavior, asymptotes, transformations, and maximums and minimums to analyze and graph functions.
F. Use a graphing calculator or computer-generated graphs of functions for analysis.

III. Domain and Range
A. State the domains and ranges of parent functions including linear, power, polynomial, rational, radical, exponential, logarithmic, trigonometric, inverse trigonometric, and absolute value functions.
B. Use the domains and ranges of the parent functions and the ideas of transformations, symmetry, periodic behavior, asymptotes, and pattern recognition to determine the domains and ranges of general functions.
C. Connect the domains and ranges of functions with combinations, compositions, and inverse functions.

IV. Function Relationships and Operations
A. Find combinations and compositions of functions represented using a description, a table of values, a graph, or a formula.
B. Use and create piecewise defined functions for a given problem situation.
C. Represent an absolute value function as a piecewise defined function.
D. Relate the concept of an inverse function to function composition, one-to-one functions, and domain/range relationships.
E. Find inverse functions and use inverse function notation.
F. Use function composition to verify an inverse function relationship.
G. Graph an inverse function.

V. Real World Applications through Modeling
A. Determine a valid domain and range for situations represented in words, a table of values, a graph, or a formula.
B. Use a given mathematical model to analyze a problem.
C. Write a mathematical model for a problem situation represented as a description, a table of values, or a graph.
D. Use a mathematical model to make predictions.
E. Compare and contrast linear, exponential and logarithmic growth models.
F. Use right triangle trigonometry and the Laws of Sines and Cosines to solve problems.

VI. Problem Solving
A. Develop proficiency in solving equations both by hand and with appropriate technology using pattern recognition, inverse function relations, or other algebraic techniques.
B. Recognize techniques that potentially introduce extraneous solutions.
C. Solve polynomial equations emphasizing the root-factor relationship and the number of expected solutions based on the Fundamental Theorem of Algebra.
D. Solve exponential and logarithmic equations.
E. Solve trigonometric equations using methods including algebraic techniques, inverse trigonometric functions, memorization of basic trigonometric values, trigonometric identities, and the use of technology.
F. Analyze graphs of non-linear systems of equations to determine the number of solutions.

VII. Calculus Transition Topics
A. Evaluate the difference quotient and interpret it in the context of a problem situation.
B. Verify trigonometric identities, including reciprocal identities, Pythagorean identities, sum, difference, double and half-angle identities.
C. Write the trigonometric form of a complex number given in standard form and convert between the two forms.
D. Sketch simple polar graphs.
E. Use technology to approximate trigonometric function values.

F. Determine the magnitude and direction of vectors, add and subtract vectors geometrically and algebraically, resolve vectors into components and evaluate dot products.
G. Perform binomial expansions through pattern recognition and use of The Binomial Theorem.
H. Investigate concavity as a rate of change.
I. Define a radian and use radian measures.
J. Generate sequences and associated sums using simple patterns and determine their formulas.
K. Find general terms of sequences with emphasis on appropriate notation.
L. Use sigma notation to express series.
M. Evaluate finite arithmetic and geometric series, recognizing linear and exponential connections.
N. Graph the inverse sine, inverse cosine, and inverse tangent functions.

COURSE REQUIREMENTS:

The dates listed are subject to change.

1. Chapter Tests (see attached long range plan)
2. Assigned homework
3. Weekly quizzes
4. Final Exam

EVALUATION AND GRADING SCALE:

Unit tests	65 %
Quizzes	30 %
Homework/Explorations	5 %
Total	100 %

Overall Class Grade will be calculated as follows:

Semester One	45 %
Semester Two	45 %
Final Exam	10 %

Grading Scale:	90 -100%	A
	80 – 89%	B
	70 – 79%	C
	60 – 69%	D
	59% or below	F

TENTATIVE COURSE SCHEDULE:

See attached long range plans.

INFORMATION ON STUDENT ACCESS AND ACADEMIC DISHONESTY:

From the Olathe South High School student handbook/calendar: "Academic Honesty: Students are expected to do their own work. Cheating on assignments or tests results in a ZERO for that assignment or test and may result in further disciplinary action."