Anthony Wayne Local Schools

Course of Study

Calculus Honors

Anthony Wayne Local Schools Mathematics Belief Statements

All Generals will experience an innovative and engaging curriculum with instruction that is personalized, promotes creativity and application, and provides real-world experiences that facilitate deeper learning.

AWLS believes Mathematics instruction should:

- identify skill gaps for individual students and work to close them
- include engaging learning activities where all learners can grow through productive struggle.
- develop strong number sense with the ability to manipulate numbers and perform mental math with an emphasis on subitizing
- provide scenarios where real world problems help to provide a path towards being future ready students.
- develop strong mathematical modeling and reasoning skills that continually build on prior knowledge.
- encourage students to be risk takers, demonstrate resilience and grit, while solving complex mathematical problems.
- encourage flexibility, creativity, and communication while working collaboratively with peers.
- include consistent and cohesive academic vocabulary through all grade-levels that is utilized by both teachers and students

Calculus Honors Course Description:

This class is meant to prepare students to succeed in calculus during their first year of college. It is not meant to help students earn college credit but to give students a strong foundation in calculus. Topics covered in the first and second semester are limits and their properties, derivatives, applications of derivatives, integrals, logarithmic, transcendental functions, applications of integrals and methods of integration. A graphing calculator is required for this course, preferably the TI 83 Plus or the TI 84.

Domain/ Conceptual Category	Standard	
Change	CHA-1.A	Interpret the rate of change at an instant in terms of average rates of change over intervals containing that instant.

Limits	LIM-1.A	Represent limits analytically using correct notation.
Limits	LIM-1.B	Interpret limits expressed in analytic notation.
Limits	LIM-1.C	Estimate limits of functions.
Limits	LIM-1.D	Determine the limits of functions using limit theorems.
Limits	LIM-1.E	Determine the limits of functions using equivalent expressions for the function or the squeeze theorem
Limits	LIM-2.A	Justify conclusions about continuity at a point using the definition.
Limits	LIM-2.B	Determine intervals over which a function is continuous.
Limits	LIM-2.C	Determine values of x or solve for parameters that make discontinuous functions continuous, if possible.
Limits	LIM-2.D	Interpret the behavior of functions using limits involving infinity.
Analysis of Functions	FUN-1.A	Explain the behavior of a function on an interval using the Intermediate Value Theorem.
Change	CHA-2.A	Determine average rates of change using difference quotients.
Change	CHA-2.B	Represent the derivative of a function as the limit of a difference quotient.
Change	CHA-2.C	Determine the equation of a line tangent to a curve at a given point.
Change	CHA-2.D	Estimate derivatives
Analysis of Functions	FUN-2.A	Explain the relationship between differentiability and continuity.
Analysis of Functions	FUN-3.A	Calculate derivatives of familiar functions.
Limits	LIM-3.A	Interpret a limit as a definition of a derivative.
Analysis of Functions	FUN-3.B	Calculate derivatives of products and quotients of differentiable functions.
Analysis of Functions	FUN-3.C	Calculate derivatives of compositions of differentiable functions.
Analysis of Functions	FUN-3.D	Calculate derivatives of implicitly defined functions.
Analysis of Functions	FUN-3.E	Calculate derivatives of inverse and inverse trigonometric functions.

Analysis of Functions	FUN-3.F	Determine higher order derivatives of a function
Change	CHA-3.A	Interpret the meaning of a derivative in context.
Change	CHA-3.B	Calculate rates of change in applied contexts.
Change	CHA-3.C	Interpret rates of change in applied contexts.
Change	CHA-3.D	Calculate related rates in applied contexts.
Change	CHA-3.E	Interpret related rates in applied contexts.
Change	CHA-3.F	Approximate a value on a curve using the equation of a tangent line.
Limits	LIM-4.A	Determine limits of functions that result in indeterminate forms.
Analysis of Functions	FUN-1.B	Justify conclusions about functions by applying the Mean Value Theorem over an interval.
Analysis of Functions	FUN-1.C	Justify conclusions about functions by applying the Extreme Value Theorem.
Analysis of Functions	FUN-4.A	Justify conclusions about the behavior of a function based on the behavior of its derivatives.
Analysis of Functions	FUN-4.B	Calculate minimum and maximum values in applied contexts or analysis of functions.
Analysis of Functions	FUN-4.C	Interpret minimum and maximum values calculated in applied contexts.
Analysis of Functions	FUN-4.D	Determine critical points of implicit relations.
Analysis of Functions	FUN-4.E	Justify conclusions about the behavior of an implicitly defined function based on evidence from its derivatives.
Change	CHA-4.A	Interpret the meaning of areas associated with the graph of a rate
Limits	LIM-5.A	Approximate a definite integral using geometric and numerical methods.
Limits	LIM-5.B	Interpret the limiting case of the Riemann sum as a definite integral.
Limits	LIM-5.C	Represent the limiting case of the Riemann sum as a definite integral
Analysis of Functions	FUN-5.A	Represent accumulation functions using definite integrals.

Analysis of Functions	FUN-6.A	Calculate a definite integral using areas and properties of definite integrals.
Analysis of Functions	FUN-6.B	Evaluate definite integrals analytically using the Fundamental Theorem of Calculus.
Analysis of Functions	FUN-6.C	Determine antiderivatives of functions and indefinite integrals, using knowledge of derivatives.
Analysis of Functions	FUN-6.D	For integrands requiring substitution or rearrangements into equivalent forms: a) Determine indefinite integrals b)Evaluate definite integrals
Analysis of Functions	FUN-7.A	Interpret verbal statements of problems as differential equations involving a derivative expression.
Analysis of Functions	FUN-7.B	Verify solutions to differential equations.
Analysis of Functions	FUN-7.C	Estimate solutions to differential equations.
Analysis of Functions	FUN-7.D	Determine general solutions to differential equations.
Analysis of Functions	FUN-7.E	Determine particular solutions to differential equations.
Analysis of Functions	FUN-7.F	Interpret the meaning of a differential equation and its variables in context.
Analysis of Functions	FUN-7.G	Determine general and particular solutions for problems involving differential equations in context.
Change	CHA-4.B	Determine the average value of a function using definite integrals.
Change	CHA-4.C	Determine values for positions and rates of change using definite integrals in problems involving rectilinear motion.
Change	CHA-4.D	Interpret the meaning of a definite integral in accumulation problems.
Change	CHA-4.E	Determine net change using definite integrals in applied contexts.
Change	CHA-5.A	Calculate areas in the plane using the definite integral.
Change	CHA-5.B	Calculate volumes of solids with known cross sections using definite integrals.
Change	CHA-5.C	Calculate volumes of solids of revolution using definite integrals.