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CW High School

AP Calculus A

1. **Algebra Essentials (25.00%)**

Learning Targets

1.1 I can apply the point-slope, slope-intercept, and general equations of lines to graph and write equations for linear functions and write secant line equations in a particular interval.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the point-slope, slope-intercept, and general equations of lines to graph and write equations for linear functions and write secant line equations in a particular interval.
3	Developing	I can write the equation of a line in slope-intercept, point-slope and general form and transfer graphs between the different forms.
2	Basic	I can write the equation of a line in slope-intercept and point-slope form and sketch a graph from either form.
1	Minimal	I can write the equation of a line in slope-intercept form and sketch the line given the equation.
0	No Evidence	No evidence shown.

1.2 I can apply the definition of even or odd functions to analyze a function and its inverse.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the definition of even or odd functions to analyze a function and its inverse.
3	Developing	I can relate positive x and y values of a function based on it being defined as odd or even.
2	Basic	I can recognize a function as odd or even based on a table of values or equation.
1	Minimal	I can identify a function as odd or even based on its graph.
0	No Evidence	No evidence shown.

1.3 I can apply the exponent rules to graph, write equations for, and solve exponential equations.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the exponent rules to graph, write equations for, and solve exponential equations.
3	Developing	I can produce and solve an exponential equation using a formula.
2	Basic	I can solve and expential equation by creating like bases and by using logarithms.
1	Minimal	I can use the exponent rules and sketch an exponential graph.
0	No Evidence	No evidence shown.

1.4 I can find the inverse of a function, determine whether it is one-to-one and apply inverse properties and logarithms to solve equations.

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Learning Target	Descriptor	Definition
4	Proficient	I can find the inverse of a function, determine whether it is one-to-one and apply inverse properties and logarithms to solve equations.
3	Developing	I can utilize logarithmic properties to rewrite or simplity logaritmic expressions.
2	Basic	I can write the inverse of an exponential function as a logarithmic expression.
1	Minimal	I can find and sketch the inverse of a function or relation.
0	No Evidence	No evidence shown.

1.5 I can predict graphs of trigonometric functions,correctly state the values of the six trigonometric functions and solve trigonometric equations.

Learning Target	Descriptor	Definition
4	Proficient	I can predict graphs of trigonometric functions,correctly state the values of the six trigonometric functions and solve trigonometric equations.
3	Developing	I can graph a sine, cosine or tangent graph with a phase shift, vertical shift and change of period
2	Basic	I can state the values of the six trigonometric functions for all common angles on a unit circle.
1	Minimal	I can state the value of the six trigonometric functions for multiples of pi/2 on the unit circle.
0	No Evidence	No evidence shown.

2. Average vs. Instantaneous Rate of Change and Limits (25.00%)

Learning Targets

2.1 I can compare the average rate of change of a function over an interval to the instantaneous rate of change of the function at any point and sketch each.

Learning Target	Descriptor	Definition
4	Proficient	I can compare the average rate of change of a function over an interval to the instantaneous rate of change of the function at any point and sketch each.
3	Developing	I can calculate the average rate of change of a function in a given interval.
2	Basic	I can calculate the instantaneous rate of change of a function at a point.
1	Minimal	I can find the average rate of change of a function in an interval using a table.
0	No Evidence	No evidence shown.

2.2 I can find limits (general, left-hand, and right-hand) graphically, algebraically, and by substitution at specific values and as functions approach infinity.

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Learning Target	Descriptor	Definition
4	Proficient	I can find limits (general, left-hand, and right-hand) graphically, algebraically, and by substitution at specific values and as functions approach infinity.
3	Developing	I can analyze the limit of a function as it approaches infinity.
2	Basic	I can analyze the limit of a function at a point by algebraically reducing the function to its most basic form.
1	Minimal	I can find the limits (general, left-hand, and right-hand) of a function at a point by looking a a graph or by substitution.
0	No Evidence	No evidence shown.

2.3 I can locate horizontal and vertical asymptotes of functions by applying the zero product property and utilize limits to predict end behavior models.

Learning Target	Descriptor	Definition
4	Proficient	I can locate horizontal and vertical asymptotes of functions by applying the zero product property and utilize limits to predict end behavior models.
3	Developing	I can utilize the three "degree ratios" of a fraction to locate horizontal asmptotes.
2	Basic	I can factor a function to locate vertical asymptotes.
1	Minimal	I can state the x-value of a vertical asmyptote given a function in factored form.
0	No Evidence	No evidence shown.

2.4 I can classify functions as continuous, as having removable discontinuities, or non-removable discontinuities.

Learning Target	Descriptor	Definition
4	Proficient	I can classify functions as continuous, as having removable discontinuities, or non-removable discontinuities.
3	Developing	I can analyze a piece-wise function at a point for continuity.
2	Basic	I can analyze and equation to determine its continuity.
1	Minimal	I can examine the graph of a function and describe it as continuous or discontinuous at a point.
0	No Evidence	No evidence shown.

2.5 I can use the four-step process to find the slope of a tangent line through a particular point on a curve, then using the point-slope formula, write the equation of the line tangent or normal to the curve at that point and find where a

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Learning Target	Descriptor	Definition
4	Proficient	I can use the four-step process to find the slope of a tangent line through a particular point on a curve, then using the point-slope formula, write the equation of the line tangent or normal to the curve at that point and find where a
3	Developing	I can use the four-step process to write the equation of a tangent line at any point on a curve.
2	Basic	I can use the four-step process on a third degree or higher polynomial to find the slope of the curve at point.
1	Minimal	I can use the four-step process on a second degree polynomial to find the slope of a curve at a point.
0	No Evidence	No evidence shown.

3. Derivatives and Velocity (25.00%)

Learning Targets

3.1 I can apply the definition of derivative to find the derivative of a function, use the correct notation to write the derivative, and relate the graphs of derivatives and functions.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the definition of derivative to find the derivative of a function, use the correct notation to write the derivative, and relate the graphs of derivatives and functions.
3	Developing	I can sketch a graph of the derivative of a function and locate any zero's of it.
2	Basic	I can utilize correct notation for derivative and write the value of the derivative at a point using correct notation.
1	Minimal	I can use the definition of derivative to find the derivative of a function at a point.
0	No Evidence	No evidence shown.

3.2 I can compute numerical derivatives on a calculator, recognize when a derivative will fail to exist, and apply the intermediate value theorem.

Learning Target	Descriptor	Definition
4	Proficient	I can compute numerical derivatives on a calculator, recognize when a derivative will fail to exist, and apply the intermediate value theorem.
3	Developing	I can analyze an equation to determine where a derivative will fail to exist.
2	Basic	I can locate points on a graph where a derivative will fail to exist.
1	Minimal	I can calculate a numerical derivative on a calculator.
0	No Evidence	No evidence shown.

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3.3 I can find derivatives by applying the various rules for derivatives. (constant, power, constant multiple, sum and difference, product and quotient), and find higher order derivatives.

Learning Target	Descriptor	Definition
4	Proficient	I can find derivatives by applying the various rules for derivatives. (constant, power, constant multiple, sum and difference, product and quotient), and find higher order derivatives.
3	Developing	I can use the quotient rule and simplify the answer.
2	Basic	I can use the product rule .
1	Minimal	I can use the simple power rule, constant multiple rule, and sum and difference rule to find a derivative.
0	No Evidence	No evidence shown.

3.4 I can correlate the average and instantaneous rates of change to velocity, correlate that velocity to the speed of an object, use derivatives and graphs to calculate acceleration and velocity, and explain why an

Learning Target	Descriptor	Definition
4	Proficient	I can correlate the average and instantaneous rates of change to velocity, correlate that velocity to the speed of an object, use derivatives and graphs to calculate acceleration and velocity, and explain why an
3	Developing	I can find where an object changes direction using derivatives, its acceleration, and whether it is speeding up or slowing down using equations or graphs.
2	Basic	I can find the speed and average velocity of an object given its position equation or graph.
1	Minimal	I can find the instantaneous velocity of an object given the equation of its position or graph.
0	No Evidence	No evidence shown.

4. Complex Derivatives (25.00%)

Learning Targets

4.1 I can analyze various trigonometric or Inverse Trigonometric functions to find the equation of tangent and normal lines at various points both analytically and numerically and find where the slope of the tangent line is equal to a value.

Learning Target	Descriptor	Definition
4	Proficient	I can analyze various trigonometric or Inverse Trigonometric functions to find the equation of tangent and normal lines at various points both analytically and numerically and find where the slope of the tangent line is equal to a value.
3	Developing	I can write the equation of the lines tangent and Normal to a trigonometric graph at any point on the graph.

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Learning Target	Descriptor	Definition
2	Basic	I can use a derivative to analyze the slope of the tangent line to a trigonometric function analytically.
1	Minimal	I can find the slope of the tangent line of a trigonometric function at a point numerically.
0	No Evidence	No evidence shown.

4.2 I can recognize when to use the chain rule and apply it to find the derivative of complex algebraic and trigonometric or Inverse trigonometric functions.

Learning Target	Descriptor	Definition
4	Proficient	I can recognize when to use the chain rule and apply it to find the derivative of complex algebraic and trigonometric or Inverse trigonometric functions.
3	Developing	I can find the derivative of a trigonometric function to a power. example: (sin 2x)^2
2	Basic	I can find the derivative of a trigonometric function with more than an "x" after the trig function. example: sin(2x)
1	Minimal	I can use the general power rule to find the derivative of a parenthesis function raised to a power.
0	No Evidence	No evidence shown.

4.3 I can classify functions as explicit or implicit and apply implicit differentiation to functions as necessary, then write the equation of the tangent line to the function at a point.

Learning Target	Descriptor	Definition
4	Proficient	I can classify functions as explicit or implicit and apply implicit differentiation to functions as necessary, then write the equation of the tangent line to the function at a point.
3	Developing	I can implicitly differentiate a function with an implicit chain rule as needed.
2	Basic	I can implicitly differentiate a function that has "xy products or quotients.
1	Minimal	I can find the derivative of an implicit function that does not have any products or quotients in it.
0	No Evidence	No evidence shown.

4.4 I can calculate the derivative of any exponential or logarithmic function both analytically and numerically and utilize the chain rule when necessary.

Learning Target	Descriptor	Definition
4	Proficient	I can calculate the derivative of any exponential or logarithmic function both analytically and numerically and utilize the chain rule when necessary.
3	Developing	I can calculate the derivative of a log of any base or an any base exponential function analytically .

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Learning Target	Descriptor	Definition
2	Basic	I can calculate the derivative or a natural log or e^x function analytically.
1	Minimal	I can calculate the derivative of any exponential or logarithmic function numerically.
0	No Evidence	No evidence shown.

Submitted on 7/8/2019 by