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CW High School

AP Calculus B

1. Unit 5--Applications of Derivatives (25.00%)

Learning Targets

1.1 I can locate absolute and local extrema, find critical points and apply the extreme value theorem to find maximum and minimum values of a function over a closed interval.

Learning Target	Descriptor	Definition
4	Proficient	I can locate absolute and local extrema, find critical points and apply the extreme value theorem to find maximum and minimum values of a function over a closed interval.
3	Developing	I can find local and absolute extrema of functions analytically.
2	Basic	I can locate critical points analytically.
1	Minimal	I can locate critical numbers analytically.
0	No Evidence	No evidence shown.

1.2 I can apply the mean value theorem over any interval in a continuously differentiable function to find the point in that interval where the mean value theorem is satisfied or explain why the mean value theorem does not apply.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the mean value theorem over any interval in a continuously differentiable function to find the point in that interval where the mean value theorem is satisfied or explain why the mean value theorem does not apply.
3	Developing	I can evaluate the endpoints of a function in a closed interval and compare their value to any critical points in the closed interval to state maximum and minimum values of the function in that interval.
2	Basic	I can locate a point where the derivative of a function is equal to the slope of the secant line in a closed interval.
1	Minimal	I can find the x and y coordinates where the derivative of a function is equal to a specific value.
0	No Evidence	No evidence shown.

1.3 I can use the second derivative test to locate points of inflection and discuss the concavity of a function.

Learning Target	Descriptor	Definition
4	Proficient	I can use the second derivative test to locate points of inflection and discuss the concavity of a function.
3	Developing	I can evaluate a second derivative at a point to find the concavity of a function.
2	Basic	I can find where the second derivative of a function equals zero, then find the point of inflection.

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Learning Target	Descriptor	Definition
1	Minimal	I can find the second derivative of a function.
0	No Evidence	No evidence shown.

1.4 I can create interval tables and sign charts with first and second derivatives to connect the slope, concavity, critical points, increase or decreasing nature, and points of inflection to the graph of a function.

Learning Target	Descriptor	Definition
4	Proficient	I can create interval tables and sign charts with first and second derivatives to connect the slope, concavity, critical points, increase or decreasing nature, and points of inflection to the graph of a function.
3	Developing	I can use a position function to find the velocity and acceleration functions and describe the motion of a particle.
2	Basic	I can create a sign chart to analyze the concavity of a function by using the second derivative.
1	Minimal	I can create a sign chart to analyze the increasing or decreasing nature of the graph of a function using the first derivative.
0	No Evidence	No evidence shown.

2. Unit 6--Differentials (25.00%)

Learning Targets

2.1 I can write a mathematical model and analyze it to predict the minimum and maximum values of function and interpret the results.

Learning Target	Descriptor	Definition
4	Proficient	I can write a mathematical model and analyze it to predict the minimum and maximum values of function and interpret the results.
3	Developing	I can locate the maximum or minimum value of a optimization function using technology
2	Basic	I can reduce equations to one variable in optimization problems.
1	Minimal	I can write equations to descibe the different parts of an optimization problem.
0	No Evidence	No evidence shown.

2.2 I can discuss the local linearity of a function and produce a linear model for the function, use the linear model to predict values close to that point, and apply the concavity of the function to explain if the estimate is high or low.

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Learning Target	Descriptor	Definition
4	Proficient	I can discuss the local linearity of a function and produce a linear model for the function, use the linear model to predict values close to that point, and apply the concavity of the function to explain if the estimate is high or low.
3	Developing	I can find and use the differential of a function at a specific point to approximate the change in y of the function and compare it to the actual change in y.
2	Basic	I can use a linear model to predict values of a function near a point.
1	Minimal	I can write a linear model to represent the shape of a function at a specific point.
0	No Evidence	No evidence shown.

2.3 I can compare the rates of change of two or more variables in a function with respect to time.

Learning Target	Descriptor	Definition
4	Proficient	I can compare the rates of change of two or more variables in a function with respect to time.
3	Developing	I can use the chain rule to differentiate functions with respect to time.
2	Basic	I can implicitly use the product or quotient rule to differentiate a function with respect to time.
1	Minimal	I can implicitly differentiate a power function with respect to time.
0	No Evidence	No evidence shown.

3. Unit 7--Areas and Integration (25.00%)

Learning Targets

3.1 I can use various Reimann Sums and computer technology to estimate the area under a curve and state whether the approximation is a high or low estimate based on the nature of the graph.

Learning Target	Descriptor	Definition
4	Proficient	I can use various Reimann Sums and computer technology to estimate the area under a curve and state whether the approximation is a high or low estimate based on the nature of the graph.
3	Developing	I can use a calculator program to approximate the area under a curve using an equation.
2	Basic	I can interpret data and use midpoint and trapezoidal approximations for areas under curves.
1	Minimal	I can interpret data and use Left and Right Reimann Sums to approximate area under curves..
0	No Evidence	No evidence shown.

3.2 I can find the distance and displacement of an object by analyzing the area under a velocity-time graph or from data and use correct signs, notations, and units to interpret the results.

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Learning Target	Descriptor	Definition
4	Proficient	I can find the distance and displacement of an object by analyzing the area under a velocity-time graph or from data and use correct signs, notations, and units to interpret the results.
3	Developing	I can use correct units to state the total distance travelled, displacement, and the acceleration of an object given a velocity-time equation by evaluating an integral with computer technology or analytically.
2	Basic	I can find the total distance travelled by and object by analyzing the area under the velocity vs time graph using intervals and absolute values.
1	Minimal	I can find the displacement of an object by analyzing the area under the velocity vs time graph or from data.
0	No Evidence	No evidence shown.

3.3 I can use definite integrals and antidifferentiation to find the area between the x-axis and a curve analytically using correct notation.

Learning Target	Descriptor	Definition
4	Proficient	I can use definite integrals and antidifferentiation to find the area between the x-axis and a curve analytically using correct notation.
3	Developing	I can apply the rules of definite integrals (order, zero, constant multiple, sum and difference and additive) to analyze integrals.
2	Basic	I can find the anti-derivative of a trigonometric function, exponential function or inverse function and evaluate a definite integral analytically.
1	Minimal	I can find the anti-derivative of a simple power function and solve the definite integral
0	No Evidence	No evidence shown.

3.4 I can find the average (mean) value of a function or data over any closed interval and use the mean value theorem to locate where the function is at its mean value.

Learning Target	Descriptor	Definition
4	Proficient	I can find the average (mean) value of a function or data over any closed interval and use the mean value theorem to locate where the function is at its mean value.
3	Developing	I can correctly reference the mean value theorem and use numerical integration and graphs to locate x-values where a function is at its mean value.
2	Basic	I can recognize whether or not the mean value theorem will be true for a function in an interval and find the average velocity of a function given velocity data or a velocity function.
1	Minimal	I can find the mean value of a function in a closed interval analytically or graphically.
0	No Evidence	No evidence shown.

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5 I can apply both parts of The Fundamental Theorem of calculus to find the derivative of an antiderivative and evaluate a definite integral.

Learning Target	Descriptor	Definition
4	Proficient	I can apply both parts of The Fundamental Theorem of calculus to find the derivative of an antiderivative and evaluate a definite integral.
3	Developing	I can apply the Fundamental Theorem of Calculus to find the derivative of an integral with a constant as its lower limit of integration.
2	Basic	I can find zeros and utilize absolute values to find areas between the x-axis and a curve with areas below and above the axis.
1	Minimal	I can find the area between a function and the x-axis over a closed interval using the Fundamental Theorem of Calculus.
0	No Evidence	No evidence shown.

4. Unit 8--Slope Fields and Differential Equations (25.00%)

Learning Targets

4.1 I can construct a slope field for a given differential equation both by hand and by using a grapher, then sketch an approximate graph of a function through a given point.

Learning Target	Descriptor	Definition
4	Proficient	I can construct a slope field for a given differential equation both by hand and by using a grapher, then sketch an approximate graph of a function through a given point.
3	Developing	I can use a differential equation to find where slopes of functions will be zero or undefined, then sketch line segments at those points.
2	Basic	I can sketch a line segment at a point that represents the slope of a function at that point.
1	Minimal	I can evaluate a differential equation at a point to find the slope of the function at that point
0	No Evidence	No evidence shown.

4.2 I can use Euler's Method and local linearity to approximate the value of a function at a point given its derivative and nearby point, sketch the behavior of the function at that point, and utilize the concavity of the function to explain whether the

Learning Target	Descriptor	Definition
4	Proficient	I can use Euler's Method and local linearity to approximate the value of a function at a point given its derivative and nearby point, sketch the behavior of the function at that point, and utilize the concavity of the function to explain whether the
3	Developing	I can use the derivative of a differential equation to test the concavity of a function.
2	Basic	I can I can sketch the approximate graph of a function near a point by analyzing its change in x and y and plotting a new point.
1	Minimal	I can evaluate a differential equation at a point to find the change in y given a small change in x.
0	No Evidence	No evidence shown.

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3 I can solve initial value and general solution differential equations by separating the variables and using substitution to find the constant.

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Learning Target	Descriptor	Definition
4	Proficient	I can solve initial value and general solution differential equations by separating the variables and using substitution to find the constant.
3	Developing	I can substitute an intial condition into the antiderivative of a differential equation.
2	Basic	I can antidifferentiate both sides of a differential equation by separating the variables.
1	Minimal	I can separate the variables in a differential equation.
0	No Evidence	No evidence shown.

4.4 I can evaluate integrals where substitution is necessary.

Learning Target	Descriptor	Definition
4	Proficient	I can evaluate integrals where substitution is necessary.
3	Developing	I can change the limits of integration when using substitution to evaluate a definite integral.
2	Basic	I can use substitution to evaluate the integral of a trigonometric function with a polynomial in the integrand.
1	Minimal	I can use substitution to evaluate an integral where powers differ by one degree.
0	No Evidence	No evidence shown.

4.5 I can use the law of exponential change to separate the variables and solve growth and decay problems.

Learning Target	Descriptor	Definition
4	Proficient	I can use the law of exponential change to separate the variables and solve growth and decay problems.
3	Developing	I can evaluate a continuously compounding interest, bacteria, or heating and cooling law problem.
2	Basic	I can utilize half-lives in finding a decay constant.
1	Minimal	I can find a growth or decay constant by substitution of points into an exponential function.
0	No Evidence	No evidence shown.

Submitted on 10/29/2019 by Bill Munch