

## CV Guarantees AP Calculus AB

<b>Big Idea: Limits</b>			
<b>Standard:</b> • NA		<b>Timeline:</b> Unit 1- 2  1 <sup>st</sup> Semester	
<b>Key Vocabulary:</b>			
<ul style="list-style-type: none"> <li>• Limits at infinity</li> <li>• Limit</li> <li>• Infinite Limits</li> <li>• Substitute</li> <li>• Indeterminate form</li> </ul>	<ul style="list-style-type: none"> <li>• As <math>x</math> approaches</li> <li>• Conjugate</li> <li>• Factor</li> <li>• Reciprocal</li> <li>• One-sided Limits</li> </ul>	<ul style="list-style-type: none"> <li>• Cancel</li> <li>• Hole</li> <li>• Vertical Asymptote</li> <li>• Horizontal Asymptote</li> </ul>	
<b>Knowledge</b>	<b>Reasoning</b>	<b>Performance Skills</b>	<b>Product Examples</b>
<ul style="list-style-type: none"> <li>• I can write limits using correct notation</li> <li>• I understand what a limit means</li> <li>• I can find limits by looking at a graph</li> </ul>	<ul style="list-style-type: none"> <li>• I can look at a limit and determine which method I will need to use in order to solve. Will I need to substitute, multiply by the conjugate, multiply by the reciprocal, or factor?</li> <li>• I can use the given information to determine how I will find the answer.</li> </ul>	<ul style="list-style-type: none"> <li>• I can find limits at infinity</li> <li>• I can find infinite limits</li> <li>• I can find limits analytically, graphically, and numerically</li> </ul>	<ul style="list-style-type: none"> <li>• I can understand the behavior of a function using limits</li> <li>• I find vertical asymptotes, horizontal asymptotes, and holes using limits</li> </ul>
<b>Resources:</b>			
<ul style="list-style-type: none"> <li>• AP Classroom</li> <li>• Mark Sparks Curriculum Handouts</li> <li>• AP Calculus 11th Edition</li> <li>• Graphing Calculators</li> <li>• Desmos</li> <li>• Previous AP Exam Questions</li> </ul>			

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<b>Big Idea: Derivatives</b>			
<b>Standard:</b> • NA		<b>Timeline:</b> 1 <sup>st</sup> Semester through 2 <sup>nd</sup> Semester: Units 2-5	
<b>Key Vocabulary:</b>			
<ul style="list-style-type: none"> <li>• Derivative</li> <li>• <math>y'</math></li> <li>• Prime</li> <li>• Definition of the derivative</li> <li>• Power Rule</li> <li>• Sign Chart</li> <li>• Negative</li> <li>• Composite function</li> <li>• Differentiate</li> <li>• Position</li> <li>• Speed</li> <li>• Optimization</li> <li>• Concave up</li> <li>• Differential equation</li> <li>• Mean Value Theorem</li> </ul>	<ul style="list-style-type: none"> <li>• <math>dy/dx</math></li> <li>• first derivative</li> <li>• second derivative</li> <li>• higher order derivatives</li> <li>• Product Rule</li> <li>• Increasing</li> <li>• Trig Derivatives</li> <li>• Inverse</li> <li>• Differentiable</li> <li>• Velocity</li> <li>• Related rates</li> <li>• Relative maximum</li> <li>• Concave down</li> <li>• Implicit Differentiation</li> <li>• Rolles Theorem</li> </ul>	<ul style="list-style-type: none"> <li>• <math>d/dx</math></li> <li>• first derivative test</li> <li>• second derivative test</li> <li>• Chain Rule</li> <li>• Quotient Rule</li> <li>• Decreasing</li> <li>• Positive</li> <li>• Instantaneous Rate of Change</li> <li>• Tangent line</li> <li>• Rectilinear motion</li> <li>• Acceleration</li> <li>• Relative minimum</li> <li>• Point of inflection</li> <li>• Slope fields</li> <li>• Absolute maximum</li> <li>• Absolute minimum</li> </ul>	
<b>Knowledge</b>	<b>Reasoning</b>	<b>Performance Skills</b>	<b>Product Examples</b>
<ul style="list-style-type: none"> <li>• I can memorize the definition of the derivative</li> <li>• I can understand that the derivative is the slope of the tangent line at a specific x-value</li> <li>• I can memorize all the different ways I can be asked to take the derivative</li> <li>• I can use proper notation when taking derivatives</li> <li>• I can memorize each differentiation rule</li> <li>• I can memorize the derivatives of trig functions</li> </ul>	<ul style="list-style-type: none"> <li>• I know when to use a sign chart</li> <li>• I know the relationships between <math>f</math>, <math>f'</math> and <math>f''</math>.</li> <li>• I understand the relationship between position, velocity, and acceleration</li> <li>• I know when to use the power rule, product rule, chain rule, and quotient rule.</li> </ul>	<ul style="list-style-type: none"> <li>• I can draw a slope field</li> <li>• I can draw a solution curve through a slope field</li> <li>• I can use implicit differentiation to solve related rates and give solutions to differential equations.</li> <li>• I can label my answers with proper units</li> </ul>	<ul style="list-style-type: none"> <li>• I can solve related rate problems</li> <li>• I can solve optimization problems</li> <li>• I can solve problems involving slope fields</li> <li>• I can differentiate properly</li> <li>• I can draw and correctly use sign charts</li> <li>• I can solve multiple types of problems involving rectilinear motion.</li> <li>• I can correctly justify my answers and provide supportive reasoning to receive full credit on an AP Free Response Question</li> </ul>

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### Resources:

- AP Classroom
- Mark Sparks Curriculum Handouts
- AP Calculus 11th Edition
- Graphing Calculators
- Desmos
- Previous AP Exam Questions

### Big Idea: Integrals and the Fundamental Theorem of Calculus

#### Standard:

- NA

**Timeline:** 2<sup>nd</sup> Semester: Units 6-7

### Key Vocabulary:

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>● Antiderivative</li> <li>● Anti-differentiation</li> <li>● Integral</li> <li>● Integrand</li> <li>● Constant (+C)</li> <li>● Definite Integral</li> <li>● Indefinite Integral</li> <li>● Disc method</li> <li>● Washer method</li> </ul> | <ul style="list-style-type: none"> <li>● Interval</li> <li>● Bounded</li> <li>● Area under the curve</li> <li>● Axis of rotation</li> <li>● Volume of revolution</li> <li>● Cross sections</li> <li>● Average Value of a function</li> <li>● Total Distance</li> <li>● Net Distance</li> <li>● Speed</li> </ul> | <ul style="list-style-type: none"> <li>● Left Riemann Sum</li> <li>● Right Riemann Sum</li> <li>● Midpoint Riemann Sum</li> <li>● Trapezoidal Sum</li> <li>● Fundamental Theorem of Calculus Part 1</li> <li>● Fundamental Theorem of Calculus Part 2</li> <li>● Properties of Integrals</li> </ul> |
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Knowledge	Reasoning	Performance Skills	Product Examples
<ul style="list-style-type: none"> <li>● I understand that the antiderivative is the inverse of a derivative</li> <li>● I know the difference between a definite and indefinite integral</li> <li>● I can remember to put +C at the end of all indefinite integral solutions</li> <li>● I know the difference between all Riemann Sums and understand how to find the solutions.</li> <li>● I know what FTC part 1 and FTC part 2 are.</li> <li>● I know the properties of Integrals.</li> <li>● I can memorize the formulas for area in between two curves,</li> </ul>	<ul style="list-style-type: none"> <li>● I understand that <math>f(x) &gt; g(x)</math> when finding the area between two curves and volumes with known cross sections.</li> <li>● I understand how to find which function is closer to my axis of rotation</li> <li>● I can find a Trapezoidal Riemann Sum if I know how to find the area of a trapezoid.</li> <li>● I can find the Left, Right, or Midpoint Riemann Sum if I know how to find the area of a rectangle.</li> <li>● I understand that an integral of <math>f(x)</math> gives</li> </ul>	<ul style="list-style-type: none"> <li>● I can use formulas to calculate total distance, net distance, and speed of a particle.</li> <li>● I can find my a and b values for a definite integral when finding the area between two curves by using my graphing calculator.</li> <li>● I can find a definite integral using a graphing calculator</li> <li>● I can find a definite integral by hand using FTC part 1.</li> <li>● I can apply FTC part 2 correctly.</li> </ul>	<ul style="list-style-type: none"> <li>● I know, understand, and can answer questions about integrals graphically, numerically, and analytically.</li> <li>● I know and can apply the FTC part 1 to solve integrals and questions involving integrals graphically and analytically.</li> <li>● I know and can apply FTC part 2 to answer questions involving integrals graphically and analytically.</li> </ul>

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volumes of revolution, and volumes with known cross sections.	me the exact area under the curve of $f(x)$		
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