

## AP Calculus AB Subject Group Overview - Semester 1

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|------------------|---|--|--|
| <b>Unit Name</b> | <b>MHS Unit 1 -<br/>Limits &amp; Continuity</b> | <b>MHS Unit 2 - Derivatives<br/>AP Units 2 &amp; 3</b> | <b>MHS Unit 3 - Applications of Derivatives<br/>AP Units 4 &amp; 5</b> |
|------------------|---|--|--|

| Time Frame                          | 3 Weeks   | 3 Weeks  | 3 Weeks  | 2 Weeks  | 3 Weeks   |
|-------------------------------------|---|--|--|--|---|
| <b>Standards</b>                    | AP Calc AB 1.1-1.16   | AP Calc AB 2.1-2.10  | AP Calc AB 3.1-3.6   | AP Calc AB 4.1-4.7<br>*4.2 – 4.3 moved to Unit 8   | AP Calc AB 5.1-5.12   |
| <b>Content Specific Information</b> | <p><b>AP Unit 1: Limits &amp; Continuity</b></p> <p>1.1 Introducing Calculus: Can change occur at an instant?<br/>1.2 Defining limits and using limit notation<br/>1.3 Estimating limit values from graphs<br/>1.4 Estimating limit values from tables<br/>1.5 Determining limits using algebraic properties of limits<br/>1.6 Determining limits using algebraic manipulation<br/>1.7 Selecting procedures for determining limits<br/>1.8 Determining limits using the Squeeze Theorem<br/>1.9 Connecting multiple representations of limits<br/>1.10 Exploring types of discontinuities<br/>1.11 Defining continuity at a point<br/>1.12 Confirming continuity over an interval<br/>1.13 Removing discontinuities<br/>1.14 Connecting infinite limits and vertical asymptotes<br/>1.15 Connecting limits at infinity and horizontal asymptotes<br/>1.16 Working with the Intermediate Value Theorem (IVT)</p> | <p><b>AP Unit 2: Differentiation: Definition and Basic Derivative Rules</b></p> <p>2.1 Defining average and instantaneous rates of change<br/>2.2 Defining the derivative of a function and using derivative notation<br/>2.3 Estimating derivatives of a function at a point<br/>2.4 Connecting differentiability with continuity<br/>2.5 Applying the power rule<br/>2.6 Derivative rules: constant, sum, difference, and constant multiple<br/>2.7 Derivative of <math>\cos(x)</math>, <math>\sin(x)</math>, <math>e^x</math>, and <math>\ln(x)</math><br/>2.8 The product rule<br/>2.9 The quotient rule<br/>2.10 Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions</p> | <p><b>AP Unit 3: Differentiation: Composite, Implicit, and Inverse Function</b></p> <p>3.1 The chain rule<br/>3.2 Implicit differentiation<br/>3.3 Differentiation inverse functions<br/>3.4 Differentiation inverse trigonometric functions<br/>3.5 Selecting procedures for calculating derivatives<br/>3.6 Calculative higher order derivatives</p> | <p><b>AP Unit 4: Contextual Applications of Differentiation</b></p> <p>4.1 Interpreting the meaning of the derivative in context<br/>4.4 Introduction to related rates<br/>4.5 Solving related rates problems<br/>4.6 Approximating values of a function using local linearity and linearization<br/>4.7 Using L'Hospital's rule for determining limits of indeterminate forms</p> | <p><b>AP Unit 5: Analytical Applications of Differentiation</b></p> <p>5.1 Using the mean value theorem<br/>5.2 Extreme value theorem, global versus local extrema, and critical points<br/>5.3 Determining intervals on which a function is increasing or decreasing<br/>5.4 Using the first derivative test to determine relative (local) extrema<br/>5.5 Using the candidates test to determine absolute (global) extrema<br/>5.6 Determining concavity of functions over their domains<br/>5.7 Using the second derivative test to determine extrema<br/>5.8 Sketching graphs of functions and their derivatives<br/>5.9 Connecting a function, its first derivative, and its second derivative</p> |

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| Unit Name                                     | MHS Unit 1 -<br>Limits & Continuity  | MHS Unit 2 - Derivatives<br>AP Units 2 & 3   | MHS Unit 3 - Applications of Derivatives<br>AP Units 4 & 5   |
|---|--|--|--|
| <b>Common Assessments/<br/>Major Projects</b> | Homework Quizzes<br>Formative Assessments<br>Summative Assessments   | Homework Quizzes<br>Formative Assessments<br>Summative Assessments   | Homework Quizzes<br>Formative Assessments<br>Summative Assessments   |
| <b>Resources</b>                              | <ul style="list-style-type: none"> <li>● AP Classroom (within AP Central, collegeboard.org)</li> <li>● Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>● Tony Record (Avon HS) created resources</li> <li>● www.flippedmath.com</li> <li>● Khan Academy</li> <li>● Delta Math</li> <li>● Master Math Mentor (pdf files and videos)</li> <li>● Teacher created resources</li> </ul> | <ul style="list-style-type: none"> <li>● AP Classroom (within AP Central, collegeboard.org)</li> <li>● Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>● Tony Record (Avon HS) created resources</li> <li>● www.flippedmath.com</li> <li>● Khan Academy</li> <li>● Delta Math</li> <li>● Master Math Mentor (pdf files and videos)</li> <li>● Teacher created resources</li> </ul> | <ul style="list-style-type: none"> <li>● AP Classroom (within AP Central, collegeboard.org)</li> <li>● Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>● Tony Record (Avon HS) created resources</li> <li>● www.flippedmath.com</li> <li>● Khan Academy</li> <li>● Delta Math</li> <li>● Master Math Mentor (pdf files and videos)</li> <li>● Teacher created resources</li> </ul> |

## AP Calculus BC Subject Group Overview - Semester 2

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|-----------|---------------------------|--|----------------|
| Unit Name | MHS Unit 4 -<br>Integrals | MHS Unit 5 - Applications of Integrals<br>AP Units 7 & 8 | AP Exam Review |
|-----------|---------------------------|--|----------------|

| Time Frame                          | 4 Weeks   | 4 Weeks   | 3 Weeks   | 4 Weeks                      |
|-------------------------------------|---|---|---|------------------------------|
| <b>Standards</b>                    | AP Calc AB 6.1-5.114  | AP Calc AB 8.1-8.13; 4.2 – 4.3  | AP Calc AB 7.1-7.9  | All AP Calculus AB Standards |
| <b>Content Specific Information</b> | <p><b>AP Unit 6: Integration &amp; Accumulation of Change</b></p> <p>6.1 Exploring accumulations of change</p> <p>6.2 Approximating areas with Reimann sums</p> <p>6.3 Riemann sums, summation notation, and definite integral notation</p> <p>6.8 Finding antiderivatives and indefinite integrals: basic rules and notation</p> <p>6.14 Selecting techniques for antidifferentiation</p> <p>6.4 The fundamental theorem of calculus and accumulation functions</p> <p>6.5 Interpreting the behavior of accumulation functions involving area</p> <p>6.6 Applying properties of definite integrals</p> <p>6.7 The fundamental theorem of calculus and definite integrals</p> <p>6.9 Integrating using substitution</p> <p>6.10 Integrating functions using long division and completing the square</p> <p>6.11 Integrating using integration by parts</p> <p>6.12 Using linear partial fractions</p> <p>6.13 Evaluating improper integrals</p> | <p><b>AP Unit 8: Applications of Integration</b></p> <p>8.1 Finding the average value of a function on an interval</p> <p>4.2 Straight-line motion: Connecting position, velocity, and acceleration</p> <p>4.3 Rates of change in applied contexts other than motion</p> <p>8.2 Connecting position, velocity, and acceleration of functions using integrals</p> <p>8.3 Using accumulation functions and definite integrals in applied contexts</p> <p>8.4 Finding the area between curves expressed as functions of <math>y</math></p> <p>8.5 Finding the area between curves expressed as functions of <math>y</math></p> <p>8.6 Finding the area between curves that intersect at more than two points</p> <p>8.7 Volumes with cross sections: squares and rectangles</p> <p>8.8 Volumes with cross sections: triangles and semicircles</p> <p>8.9 Volume with disc method: revolving around the <math>x</math>- or <math>y</math>-axis</p> <p>8.10 Volume with disc method: revolving around other axes</p> <p>8.11 Volume with washer method: Revolving around the <math>x</math>- or <math>y</math>-axis</p> <p>8.12 Volume with washer method: revolving around other axes</p> | <p><b>AP Unit 7: Differential Equations</b></p> <p>7.1 Modeling situations with differential equations</p> <p>7.2 Verifying solutions for differential equations</p> <p>7.3 Sketching slope fields</p> <p>7.4 Reasoning using slope fields</p> <p>7.5 Approximating solutions using Euler’s method</p> <p>7.6 Finding general solutions using separation of variables</p> <p>7.7 Finding particular solutions using initial conditions and separation of variables</p> <p>7.8 Exponential models with differential equations</p> <p>7.9 Logistic models with differential equations</p> |                              |

## AP Calculus BC Subject Group Overview - Semester 2

| Unit Name                                  | MHS Unit 4 -<br>Integrals  | MHS Unit 5 - Applications of Integrals<br>AP Units 7 & 8   | AP Exam Review |
|--|--|--|----------------|
| <b>Common Assessments / Major Projects</b> | Homework Quizzes<br>Formative Assessments<br>Summative Assessment  | Common Homework Quizzes<br>Common Formative Assessments<br>Common Summative Assessments  |                |
| <b>Resources</b>                           | <ul style="list-style-type: none"> <li>● AP Classroom (within AP Central, collegeboard.org)</li> <li>● Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>● Tony Record (Avon HS) created resources</li> <li>● www.flippedmath.com</li> <li>● Khan Academy</li> <li>● Delta Math</li> <li>● Master Math Mentor (pdf files and videos)</li> <li>● Teacher created resources</li> </ul> | <ul style="list-style-type: none"> <li>● AP Classroom (within AP Central, collegeboard.org)</li> <li>● Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>● Tony Record (Avon HS) created resources</li> <li>● www.flippedmath.com</li> <li>● Khan Academy</li> <li>● Delta Math</li> <li>● Master Math Mentor (pdf files and videos)</li> <li>● Teacher created resources</li> </ul> |                |