

## Calculus BC Schedule--Chapter 4 Applications of Derivatives

<u>Date</u>	<u>Lesson</u>	<u>HW Assignment</u>
7-Oct	4.1 Extreme Values of Functions <i>Asynchronous Learning Day</i>	<b>HW2</b> --p.194 #11,15,17, Video on Extreme Values Using Calculator
8-Oct	4.1 Extreme Values of Functions	<b>HW3</b> --Video on MVT, Does MVT Apply?
9-Oct	4.2 Mean Value Theorem	<b>HW4</b> --p.202 #1,5,11,12,53
12-Oct	<b>NO SCHOOL</b>	<b>NO Additional Homework</b>
13-Oct	4.2 Mean Value Theorem <b>Quick M/C Quiz for Unit 2</b>	<b>HW5</b> --Video on 1st Derivative Test, p.202 #15,19
14-Oct	<b>1/2 Day Schedule</b> <i>SAT for some Seniors</i>	<b>NO Additional Homework</b>
15-Oct	4.2 Mean Value Theorem	<b>HW6</b> --p.202 #16,17,22, Video on Test for Concavity
16-Oct	4.3 Connecting $f'$ and $f''$ with Graph of $f$	<b>HW7</b> --p.215 #7,17,20, Video on Connecting $f'$ and $f''$ with Graph of $f$
19-Oct	4.3 Connecting $f'$ and $f''$ with Graph of $f$	<b>HW8</b> --p.215 #24,41,51, Video on 2nd Derivative Test
20-Oct	4.3 Connecting $f'$ and $f''$ with Graph of $f$	<b>HW9</b> --p.217 #33,37,39,58, Video on Linear Approximations
21-Oct	4.5 Linearization <b>Quick M/C Quiz for Unit 4</b>	<b>HW10</b> --Linearization Approximation (from AP Classroom)
22-Oct	<b>NO SCHOOL-Parent/TeacherConferences</b>	<b>NO Additional Homework</b>
23-Oct	4.5 Linearization	<b>HW11</b> --p.244 #45,59, Video on Related Rates, p.251 #8,9a
26-Oct	4.6 Related Rates	<b>HW12</b> --p.251 #9bc,11,13,14
27-Oct	4.6 Related Rates <i>SAT for some Seniors</i>	<b>HW13</b> --p.252 #19,22,23,25
28-Oct	<i>Check &amp; Connect Day</i> <b>Quick M/C Quiz for Unit 1</b>	<b>NO Additional Homework</b>
29-Oct	4.6 Related Rates	<b>HW14</b> --Related Rates (from AP Classroom)
30-Oct	<i>Chapter 4 REVIEW</i>	<b>HW15</b> --p.256 #13,18,31,32,33,36,37,39,59
2-Nov	<i>Chapter 4 REVIEW</i>	<b>STUDY for TEST!!!</b>
3-Nov	<b>NO SCHOOL--Election Day</b>	<b>STUDY for TEST!!!</b>
4-Nov	<b>Chapter 4 TEST</b>	<b>NO Additional Homework</b>
5-Nov	AP Activity: Chapter 4	<b>HW1</b> --Video on Riemann Sums AP Activity: Chapter 4 Due 11/12

# Calculus BC Schedule--Chapter 4 Applications of Derivatives

## Date

## Lesson

## HW Assignment

### UNIT 4: Applications of Derivatives

<p><b>FUN-4</b> A function's derivative can be used to understand some behaviors of the function.</p>	
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.1</b> The first derivative of a function can provide information about the function and its graph, including intervals where the function is increasing or decreasing.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.2</b> The first derivative of a function can determine the location of relative (local) extrema of the function.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.3</b> Absolute (global) extrema of a function on a closed interval can only occur at critical points or at endpoints.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.4</b> The graph of a function is concave up (down) on an open interval if the function's derivative is increasing (decreasing) on that interval. <b>FUN-4.A.5</b> The second derivative of a function provides information about the function and its graph, including intervals of upward or downward concavity. <b>FUN-4.A.6</b> The second derivative of a function may be used to locate points of inflection for the graph of the original function.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.7</b> The second derivative of a function may determine whether a critical point is the location of a relative (local) maximum or minimum. <b>FUN-4.A.8</b> When a continuous function has only one critical point on an interval on its domain and the critical point corresponds to a relative (local) extremum of the function on the interval, then that critical point also corresponds to the absolute (global) extremum of the function on the interval.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.9</b> Key features of functions and their derivatives can be identified and related to their graphical, numerical, and analytical representations. <b>FUN-4.A.10</b> Graphical, numerical, and analytical information from <math>f'</math> and <math>f''</math> can be used to predict and explain the behavior of <math>f</math>.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.A</b> Justify conclusions about the behavior of a function based on the behavior of its derivatives.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.A.11</b> Key features of the graphs of <math>f</math>, <math>f'</math>, and <math>f''</math> are related to one another.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-4.D</b> Determine critical points of implicit relations.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-4.D.1</b> A point on an implicit relation where the first derivative equals zero or does not exist is a critical point of the function.</p>
<p><b>FUN-4.E</b> Justify conclusions about the behavior of an implicitly defined function based on evidence from its derivatives.</p>	<p><b>FUN-4.E.1</b> Applications of derivatives can be extended to implicitly defined functions. <b>FUN-4.E.2</b> Second derivatives involving implicit differentiation may be relations of <math>x</math>, <math>y</math>, and <math>\frac{dy}{dx}</math>.</p>

<p><b>FUN-1</b> Existence theorems allow us to draw conclusions about a function's behavior on an interval without precisely locating that behavior.</p>	
<p><b>LEARNING OBJECTIVE</b> <b>FUN-1.B</b> Justify conclusions about functions by applying the Mean Value Theorem over an interval.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-1.B.1</b> If a function <math>f</math> is continuous over the interval <math>[a, b]</math> and differentiable over the interval <math>(a, b)</math>, then the Mean Value Theorem guarantees a point within that open interval where the instantaneous rate of change equals the average rate of change over the interval.</p>
<p><b>LEARNING OBJECTIVE</b> <b>FUN-1.C</b> Justify conclusions about functions by applying the Extreme Value Theorem.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>FUN-1.C.1</b> If a function <math>f</math> is continuous over the interval <math>[a, b]</math>, then the Extreme Value Theorem guarantees that <math>f</math> has at least one minimum value and at least one maximum value on <math>[a, b]</math>. <b>FUN-1.C.2</b> A point on a function where the first derivative equals zero or fails to exist is a critical point of the function. <b>FUN-1.C.3</b> All local (relative) extrema occur at critical points of a function, though not all critical points are local extrema.</p>
<p><b>CHA-3</b> Derivatives allow us to solve real-world problems involving rates of change.</p>	
<p><b>LEARNING OBJECTIVE</b> <b>CHA-3.A</b> Interpret the meaning of a derivative in context.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>CHA-3.A.1</b> The derivative of a function can be interpreted as the instantaneous rate of change with respect to its independent variable. <b>CHA-3.A.2</b> The derivative can be used to express information about rates of change in applied contexts. <b>CHA-3.A.3</b> The unit for <math>f'(x)</math> is the unit for <math>f</math> divided by the unit for <math>x</math>.</p>
<p><b>LEARNING OBJECTIVE</b> <b>CHA-3.D</b> Calculate related rates in applied contexts.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>CHA-3.D.1</b> The chain rule is the basis for differentiating variables in a related rates problem with respect to the same independent variable. <b>CHA-3.D.2</b> Other differentiation rules, such as the product rule and the quotient rule, may also be necessary to differentiate all variables with respect to the same independent variable.</p>
<p><b>LEARNING OBJECTIVE</b> <b>CHA-3.E</b> Interpret related rates in applied contexts.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>CHA-3.E.1</b> The derivative can be used to solve related rates problems; that is, finding a rate at which one quantity is changing by relating it to other quantities whose rates of change are known.</p>
<p><b>LEARNING OBJECTIVE</b> <b>CHA-3.F</b> Approximate a value on a curve using the equation of a tangent line.</p>	<p><b>ESSENTIAL KNOWLEDGE</b> <b>CHA-3.F.1</b> The tangent line is the graph of a locally linear approximation of the function near the point of tangency. <b>CHA-3.F.2</b> For a tangent line approximation, the function's behavior near the point of tangency may determine whether a tangent line value is an underestimate or an overestimate of the corresponding function value.</p>