Calculus AB Schedule--Chapter 4 Applications of Derivatives

Date	Lesson	HW Assignment
13-Nov	4.1 Extreme Values of Functions	**HW2**--p.194 #11,15,17, Video on Extreme Values Using Calculator, Check answers to #11,15,17 w/Calculator
16-Nov	4.1 Extreme Values of Functions	**HW3**--p.194 #47, Video on MVT, Does MVT Apply?
17-Nov	***1/2 Day Schedule*** *Asynchronous Day*	**NO Additional Homework**
18-Nov	4.2 Mean Value Theorem	**HW4**--p.202 #1,5,11,12,53
19-Nov	4.2 Mean Value Theorem	**HW5**--Video on 1st Derivative Test, p.202
20-Nov	4.2 Mean Value Theorem	**HW6**--p.202 #16,26,54 Video on Test for Concavity
23-Nov	4.3 Connecting f' and f'' with Graph of f	**HW7**--p.215 #7,17,20, Video on Connecting f ' and f '' with Graph of f
24-Nov	4.3 Connecting f' and f'' with Graph of f	**HW8**--AP Classroom HW
25-Nov	**NO SCHOOL - Day Before Turkey Day**	**NO Additional Homework**
26-Nov	**NO SCHOOL - Turkey Day**	**NO Additional Homework**
27-Nov	**NO SCHOOL - Day After Turkey Day**	**NO Additional Homework**
30-Nov	4.3 Connecting f' and f'' with Graph of f	**HW9**--p.215 #24,51, Video on 2nd Derivative Test
1-Dec	4.3 Connecting f' and f'' with Graph of f	**HW10**--p.217 #33,37,39,58, Video on Linear Approximations
2-Dec	*Check & Connect Day* **Quick M/C Quiz for Unit 4**	**NO Additional Homework**
3-Dec	4.5 Linearization	**HW11**--p.244 #45,59, Video on Related Rates, p.251 #8,9a
4-Dec	4.6 Related Rates	**HW12**--Related Rates (from AP Classroom)
7-Dec	4.6 Related Rates	**HW13**--p.251 #9bc,11,13,14
8-Dec	***1/2 Day Schedule*** *Asynchronous Day*	**NO Additional Homework**
9-Dec	4.6 Related Rates	**HW14**--p.252 #19,22,23,25
10-Dec	AP Activity: Chapter 4	AP Activity: Chapter 4 Due 12/17
11-Dec	*Chapter 4 REVIEW*	**HW15**--p.256 #13,18,31,32,33,36,37,39,59

Calculus AB Schedule--Chapter 4 Applications of Derivatives

Date	Lesson	HW Assignment
14-Dec	*Chapter 4 REVIEW*	**Study for Test**
15-Dec	**Chapter 4 TEST**	**NO Additional Homework**
16-Dec	**Check & Connect Day** *(1st & 3rd hours)*	**NO Additional Homework**
17-Dec	**Check & Connect Day** *(2nd & 4th hours*	**NO Additional Homework**
18-Dec	**Check & Connect Day** *(6th & 5th hours)*	**NO Additional Homework**
12/19-1/3	**WINTER BREAK**	**NO Additional Homework**

UNIT 4: Applications of Derivatives

FUN-1

Existence theorems allow us to draw conclusions about a function's behavior on an interval without precisely locating that behavior.

LEARNING OBJECTIVE

FUN-1.B
Justify conclusions about functions by applying the Mean Value Theorem over an interval.

ESSENTIAL KNOWLEDGE

FUN-1.B.1
If a function f is continuous over the interval $[a, b]$ and differentiable over the interval (a, b), 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.

LEARNING OBJECTIVE

FUN-1.C
Justify conclusions about functions by applying the Extreme Value Theorem.

ESSENTIAL KNOWLEDGE

FUN-1.C.1
If a function f is continuous over the interval $[a, b]$, then the Extreme Value Theorem guarantees that f has at least one minimum value and at least one maximum value on $[a, b]$.

FUN-1.C.2
A point on a function where the first derivative equals zero or fails to exist is a critical point of the function.

FUN-1.C.3
All local (relative) extrema occur at critical points of a function, though not all critical points are local extrema.

CHA-3

Derivatives allow us to solve real-world problems involving rates of change.

LEARNING OBJECTIVE

CHA-3.A
Interpret the meaning of a derivative in context.

ESSENTIAL KNOWLEDGE

CHA-3.A.1
The derivative of a function can be interpreted as the instantaneous rate of change with respect to its independent variable.

CHA-3.A.2
The derivative can be used to express information about rates of change in applied contexts.

CHA-3.A.3
The unit for $f'(x)$ is the unit for f divided by the unit for x.

LEARNING OBJECTIVE

CHA-3.D
Calculate related rates in applied contexts.

ESSENTIAL KNOWLEDGE

CHA-3.D.1
The chain rule is the basis for differentiating variables in a related rates problem with respect to the same independent variable.

CHA-3.D.2
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.

LEARNING OBJECTIVE

CHA-3.E
Interpret related rates in applied contexts.

ESSENTIAL KNOWLEDGE

CHA-3.E.1
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.

LEARNING OBJECTIVE

CHA-3.F
Approximate a value on a curve using the equation of a tangent line.

ESSENTIAL KNOWLEDGE

CHA-3.F.1
The tangent line is the graph of a locally linear approximation of the function near the point of tangency.

CHA-3.F.2
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.

Calculus AB Schedule--Chapter 4 Applications of Derivatives

Date	**Lesson**	**HW Assignment**

FUN-4

A function's derivative can be used to understand some behaviors of the function.

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