Calculus AB Schedule--Unit 4/Chapter 4 and 5: Applications of Derivatives

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 11				*31-Oct*	*1-Nov*
Lesson				5.1 Maximum and Minimum Values; Critical Numbers	5.1 Maximum and Minimum Values; Critical Numbers
HMWK				**HW1**--p.316 #7, 13,17,23,25,27,35, p.319 AP Practice #1, Calculator p.317 #66ab	**HW2**--p.317 #39, 42,51,61, p.319 AP Practice #3,6

Week 12	*4-Nov*	*5-Nov*	*6-Nov*	*7-Nov*	*8-Nov*
Lesson	5.1 Maximum and Minimum Values; Critical Numbers	**NO SCHOOL** -- Election Day	5.2 Mean Value Theorem	5.2 Mean Value Theorem	5.2 Mean Value Theorem
HMWK	**HW3**--p.317 #59, 63 p.319 AP Practice #2,5, Calculator p.317 #66,70ab	**No Additional Homework**	**HW4**--p.328 #21ab, 27ab,58, p.330 AP Practice #3, Calculator #24,29	**HW5**--p.328 #23, 22,68, p.330 AP Practice #9, Calculator #28	**HW6**--p.328 #31, 37,41, p.344 #13,17,35,37, p.347 AP Practice #4

Week 13	*11-Nov*	*12-Nov*	*13-Nov*	*14-Nov*	*15-Nov*
Lesson	5.3 Local Extrema and Concavity	5.3 Local Extrema and Concavity **Quiz 5.1 & 5.2**	**EARLY DISMISSAL** 5.3 Local Extrema and Concavity	5.3 Local Extrema and Concavity	5.3 Local Extrema and Concavity
HMWK	**HW7**--p.345 #39bc,41bc,49bc, 77,79 **Study for Quiz 5.1 & 5.2**	**HW8**--p.345 #63, 64, p.347 AP Practice #2,5,6 *November IML Math Contest after school?*	**HW9**--p.348 AP Practice #9,10,12, 14, Video on 2nd Derivative Test	**HW10**--p.345 #67b, 69b,91, p.347 AP Practice #1,7,8	**HW11**--p.345 #66, 81,85, p.347 AP Practice #3,4,11, 13

Week 14	*18-Nov*	*19-Nov*	*20-Nov*	*21-Nov*	*22-Nov*
Lesson	4.2 Linearization	4.2 Linearization **Quiz 5.3**	**EARLY DISMISSAL** 4.3 Related Rates	4.3 Related Rates	4.3 Related Rates
HMWK	**HW12**--p.278 #25, 27, Calculator p.278 #35,37, p.281 AP Practice #5,8 **Study for Quiz 5.3**	**HW13**--p.278 #7, 33,53, p.281 AP Practice #7, p.304 AP Review #2,6	**HW14**--p.286 #7, 9,10,11,13	**HW15**--p.286 #32, 33,34, p.291 AP Practice #9	**HW16**--p.286 #19, 22,35,39

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	Monday	Tuesday	Wednesday	Thursday	Friday
Week 14	*25-Nov*	*26-Nov*	*27-Nov*	*28-Nov*	*29-Nov*
Lesson	4.3 Related Rates	*Unit 4 REVIEW (Book Chapters 4 & 5)*	**NO SCHOOL --** Day Before Turkey Day	**NO SCHOOL --** Turkey Day	***NO SCHOOL --*** *Day After Turkey Day*
HMWK	**HW17**--p.288 #52, p.290 AP Practice #2,3,4,5	**HW18**--p.303 #6, 13, AP Review #4,7a, p.384 #7,9b,21, AP Review #2,4,5,8, 11 Calculator #19	**No Additional Homework**	**No Additional Homework**	**No Additional Homework**

Week 15	*2-Dec*	*3-Dec*	*4-Dec*
Lesson	*Unit 4 REVIEW (Book Chapters 4 & 5)*	**Unit 4 TEST**	**EARLY DISMISSAL** AP Activity: Unit 4 (Book Chapters 4 & 5)
HMWK	**STUDY for TEST!!!**	**No Additional Homework**	*AP Activity: Unit 4 due Dec 11*

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	Monday	Tuesday	Wednesday	Thursday	Friday

UNIT 4: Applications of Derivatives

FUN-4
A function's derivative can be used to understand some behaviors of the function.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
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.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
FUN-4.A.2
The first derivative of a function can determine the location of relative (local) extrema of the function.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
FUN-4.A.3
Absolute (global) extrema of a function on a closed interval can only occur at critical points or at endpoints.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
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.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
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.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
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.

LEARNING OBJECTIVE
FUN-4.A
Justify conclusions about the behavior of a function based on the behavior of its derivatives.

ESSENTIAL KNOWLEDGE
FUN-4.A.11
Key features of the graphs of f, f', and f'' are related to one another.

LEARNING OBJECTIVE
FUN-4.D
Determine critical points of implicit relations.

ESSENTIAL KNOWLEDGE
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 [illegible]

FUN-4.E.1
Applications of derivatives can be extended to implicitly defined functions [illegible]

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 [illegible]

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the behavior of an implicitly defined function based on evidence from its derivatives.

implicitly defined functions.

FUN-4.E.2

Second derivatives involving implicit differentiation may be relations of x, y, and $\frac{dy}{dx}$.

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.