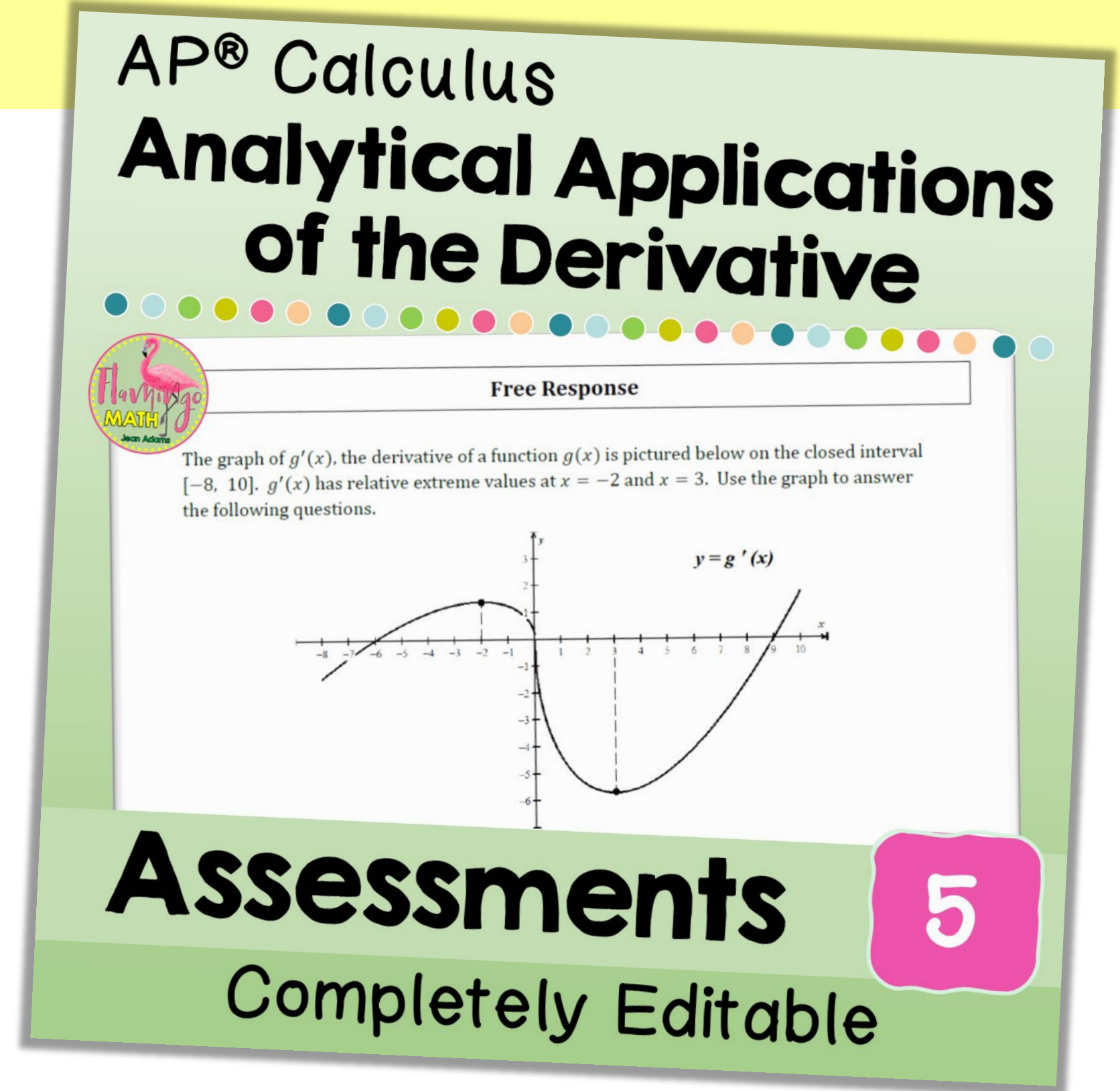
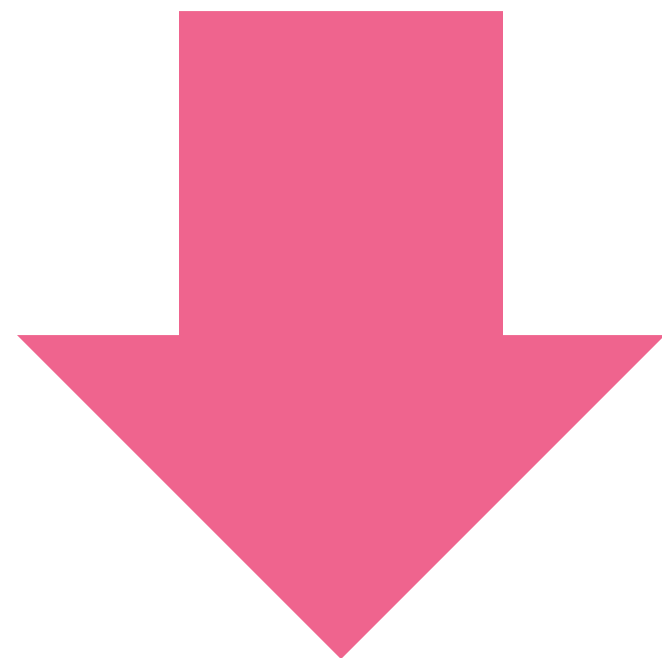


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AP Calculus
Analytic Applications of Differentiation Test #5-A

Calculator is NOT ALLOWED on this test!

Problems 1–10, multiple choice.

1. Find all critical numbers for the function: $f(x) = (9 - x^2)^{3/5}$

- A. $\{0\}$
B. $\{-3, 3\}$
C. $\{3\}$
D. $\{-3, 0, 3\}$

2. What are all values of x for which the function f defined by $f(x) = (x^2 - 3)e^{-x}$ is increasing?

- A. $x < -1$ and $x > 3$
C. $-3 < x < 1$

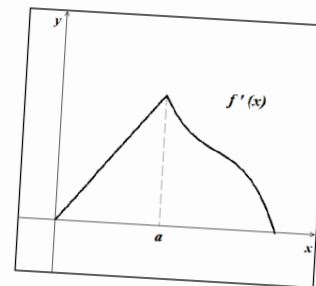
3. Let $h(x)$ be a twice-differentiable function with such that $h(2) = 14$ and $h(3) = 5$. Of the fol

- A. 10
C. -5

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4. The graph of $f'(x)$, the derivative of a function $f(x)$, is shown at right. Which of the following statements is/are true?

- A. The graph of f has a point of inflection at $x = a$
B. f is not continuous at $x = a$
C. f has a relative maximum at $x = a$
D. f is continuous but not differentiable at $x = a$



5. Find the values of x where the graph of the function f has a point of inflection.
Given: $f(x) = -\frac{1}{2}x^3 + \frac{1}{4}x^2 - \frac{1}{8}x$

7. Find the sum of the values of a and b such that $f(x) = 2ax^2 + bx + 3$ has a relative extremum at the point $(-1, 2)$.

- A. 1
B. -1
C. $\frac{5}{2}$
D. $\frac{3}{2}$

8. A function $g(x)$ is continuous on the interval $[-4, 4]$ and its first and second derivatives have the signs and zeros as given in the following table.

x	$(-4, -2)$	-2	$(-2, 0)$	0	$(0, 2)$	2	$(2, 4)$
$g'(x)$	+	0	-	-	-	0	-
$g''(x)$	-	-	-	0	+	0	-

- A. $g(x)$ has a maximum at $x = 2$
B. $g(x)$ has a minimum at $x = 2$
C. $g(x)$ has an inflection point at $x = 0$
D. $g(x)$ has an inflection point at $x = -2$

9. The graph of $f(x) = x^4 + 8x^3 - 72x^2 + 6$ is concave down for

- A. $-6 < x < 2$
B. $x > 2$
C. $x < -6$
D. $-3 - 3\sqrt{5} < x < -3 + 3\sqrt{5}$



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WHAT IS INCLUDED?

AP CALCULUS AB
UNIT 4 REVIEW

Name _____

Important Topics:

- Interpreting the Derivative in Context to Real-World scenarios
- Straight Line Motion Connecting Position, Velocity and Acceleration
- Other Rates of Change
- Related Rates
- Linearization and Local Linearity
- L'Hospital's Rule

Interpreting the Derivative.

1. The population P , of *Infinityville* is recorded every year to monitor growth of the community, in thousands of new residents, since 2015. Write the statement for $P'(t)$ that represents the statement, "The population increased by 1,500 residents during 2019."
2. If $C = f(T)$ gives the cost, in dollars, to mine T -tons of limestone from a quarry, what is the meaning of the statement $f'(5000) = 285$?
3. A tropical storm passing through the Gulf of Mexico increases the rainfall along the coastline of Florida. Let $R = f(t)$ be the amount of rainfall, in inches, and t is the time in hours, where midnight is $t = 0$. Interpret the following, in context to the scenario and include units.
A. $f(6) = 1.57$
B. $f'(6) = 0.7$
C. $f^{-1}(9) = 12$
D. $[f^{-1}(9)]' = .75$

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Multiple Choice.

4. The position function of an object moving along the x -axis is given by $s(t) = t^3 + t^2 - 8t$ for $0 \leq t \leq 10$. For what values of t is the particle moving to the right?
A. $t > 0$
B. $t > \frac{4}{3}$
C. $0 < t < \frac{4}{3}$
D. $t < \frac{4}{3}$
5. Find a linear approximation to $f(x) = x^2 e^x$ at $x = 1$. Use the tangent line to estimate $x = 1.1$.
A. 8.156
B. 7.055
C. 3.534
D. 3.433
6. If $\pi(x) = 3x\sqrt{900 - x}$ gives the total profit π , to manufacture x units of a new sunscreen product. What is the maximum profit potential for the manufacturer?
A. \$31,176.91
B. \$32,176.78
C. \$60,000.00
D. \$32,000.00
7. $\lim_{x \rightarrow 0} (1 - 3x)^{\csc x}$
A. e^3
B. $-e^3$
C. does not exist
D. does not exist

7. If $f(x) = 2x^3 + 7$, then $\lim_{x \rightarrow 0} \frac{f(x) - f(0)}{x^3}$ is

- A. 0
C. 2



Editable Review assignments



Editable assessments



Full solution sets



Extra Practice Topics



Scope and Sequence

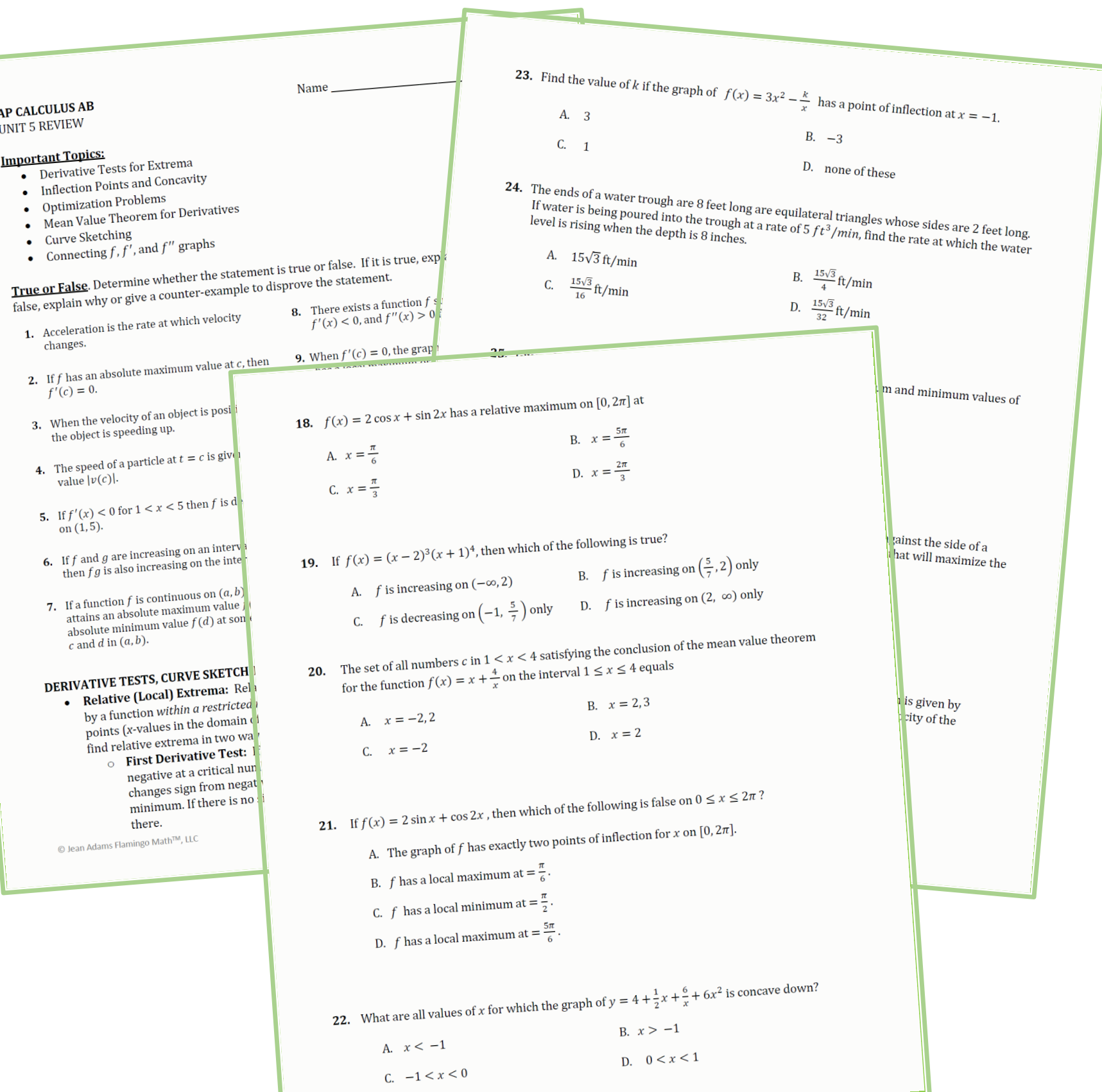
Cover the Standards

Each assessment will provide you and your students with the skills and learning objectives necessary for success in the AP Environment.

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- ☐ A pacing guide for both AB and BC lessons and testing schedule.

AP CALCULUS CURRICULUM	
Scope and Sequence	
Unit 5: Analytic Applications of Differentiation	
Lesson	Skills & Learning Objectives
[5.1] The Mean Value Theorem	☐ Apply the Mean Value Theorem to describe the behavior of a function over an interval
[5.2] Extrema on an Interval	☐ Use derivatives to find local and global extrema ☐ Use both open interval and closed interval methods for finding extrema. (Candidates Test) ☐ Use and apply the Extreme Value Theorem on intervals
[5.3] Increasing, Decreasing & First Derivative Test	☐ Use the first derivative test to find intervals of increase and decrease; maximum and minimum values
[5.4] Concavity & Second Derivative Test	☐ Use the second derivative test to find points of inflection, intervals where the function is concave up or concave down, and to find maximum and minimum values
[5.5] Sketching Graphs of Functions F , F' and F''	☐ Use the first and second derivative tests to analyze and sketch functions
[5.6] Optimization	☐ Optimize real-world situations by finding values that maximize or minimize constraints
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“ Very comprehensive! I like having the option of AP and non-AP assessments. *Abby M.* ”

“ I love the way that you set up the test (AP Style) It is hard to find good assessments for the students. Your tests are a big help! *Monica B.* ”

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“Excellent resource to prepare for the AP Calc Exam. Just finished an AP workshop and am really impressed how aligned this bundle is for getting the Calculus taught. Thank you for all the hard work put into it. It's a fabulous resource. *Linda A.*”

