Unit 9 Outline – Applications of Differentiation

Thursday 1/16	**Today's Topic:** The Accumulation Function
In-Class Examples: Notes Handout	
Homework: Worksheet 72	

Friday 1/17	**Today's Topic:** The Accumulation Function – The Fundamental Theorem of Calculus #2
In-Class Examples: Notes Handout	
Homework: Worksheet 73	

Tuesday 1/21	**Today's Topic:** Extreme Value Theorem
In-Class Examples: Notes Handout	
Homework: Worksheet 74	

Wednesday 1/22	**Today's Topic: First Derivative Test**
In-Class Examples: Notes Handout	
Homework: Worksheet 75	

Thursday 1/23	**Today's Topic:** The First Derivative Test (Graphs and Tables)
In-Class Examples: Handout	
Homework: Worksheet 76	

BLOCK DAYS

Friday 1/24	**Today's Topic:** Mean Value Theorem

Recall:

Use the Intermediate Value Theorem to show that the polynomial function $f(x) = x^3 + 2x - 1$ has a zero in the interval $[0,1]$.

In-Class Examples: Ex. 1 Determine if the Mean Value Theorem applies to $f(x) = x^3 - x$ on $[0,2]$. If so, find the value(s) guaranteed by MVT.

Ex. 2 Determine if the Mean Value Theorem applies to $f(x) = x^3 - 3x^2 + 2x$ on $[0,3]$. If so, find the value(s) guaranteed by MVT.

Ex. 3 Determine if the Mean Value Theorem applies to $f(x) = x^3 + 2x^2 - x$ on $[-1,2]$. If so, find the value(s) guaranteed by MVT.

Ex. 4 For the following functions, specifically state why MVT does not apply.

a) $f(x) = \dfrac{x+5}{x-1}$ on $[-3,5]$

b) $g(x) = x^{\frac{2}{3}}$ on $[-3,3]$

Homework: Worksheet 77

Monday 1/27	**Today's Topic: The Concavity Test**
In-Class Examples: Notes Handout	
Homework: Worksheet 78	

Tuesday 1/28	**Today's Topic:** - **First Derivative Test CheckPoint Quiz**
In-Class Examples: None	
Homework: None	

Wednesday 1/29	**Today's Topic:** - **The Second Derivative Test for Max/Min** Suppose $f'(c)=0$. If - $f''(c)>0$, then $f(x)$ has a local minimum at $x=c$. - $f''(c)<0$, then $f(x)$ has a local maximum at $x=c$. The second derivative test fails if: - $f''(c)=0$ or $f''(c)$ does not exist
In-Class Examples: Notes Handout	
Homework: Worksheet 79	

Thursday 1/30	**Today's Topic: Optimization**
In-Class Examples **1.** The sum of one number and twice another is 24. Find the two numbers so that their product is a maximum. **2.** A rectangular field of 100 square feet is to be enclosed on all four sides. Find dimensions which will result in using the least amount of fencing. **3.** A square piece of tin has 12 inches on a side. An open box is formed by cutting out equal square pieces at the corners and bending upward the projecting portions which remain. Find the maximum volume that can be obtained.	
Homework: Worksheet 80	

Friday 1/31	**Today's Topic: Optimization and Reading Graphs**
In-Class Examples **1.** A rectangular field adjacent to a river is to be enclosed. No fencing is required next to the river. If fencing costs \$3 per meter and the area to be enclosed is 1200 square meters, determine the dimensions of the field that is the least expensive. **2.** Find two positive numbers such that their product is 192 and the sum of the first and three times the second is a minimum.	
Homework: Worksheet 81	

Monday 2/3	**Today's Topic: Second Derivative Checkpoint Quiz**
In-Class Examples: None	
Homework: Worksheet 82	

Tuesday 2/4	**Today's Topic: Reading Graphs Checkpoint Quiz** Review – 1st and 2nd Derivative Test, FTC #2, Optimization and Graphs
In-Class Examples: None	
Homework: Worksheet 83	

Wednesday 2/5	**Today's Topic: Review**
In-Class Examples: None	
Homework: Worksheet 83b	

Thursday 2/6	**Today's Topic: AP Multiple Choice Questions**
In-Class Examples: None	
Homework: AP Multiple Choice Questions	

Friday 2/7	**Today's Topic:** Applications of the Derivative Examination
In-Class Examples: None	
Homework: None	