

Optimization

Based on notes by Ben Woodruff

This learning module covers the following ideas. When you make your lesson plan, it should explain and contain examples of the following:

1. Find critical values of a function. Explain why optimum values must occur at critical values. Explain the difference between local and global extrema, and explain how to find each on an interval.
2. Find intervals on which a function is increasing and decreasing. Explain how to use the first derivative test to find local extreme values of a function.
3. Find intervals on which a function is concave upwards and concave downwards. Explain how to use the second derivative test to find local extreme values of a function.
4. Construct rough sketches of curves utilizing the information gained from the first and second derivative. Utilize software to make sure you sketches are appropriate.
5. Use the first and second derivative tests to do realistic optimization problems.

Homework Suggestions

Topic	Section	Basic Practice	Good problems	Deep/Application
Extrema	4.1	1–38	39–52, 61–66	67–75
First Derivative Test	4.3	1–46, 63–68	47–60, 69–80	87–88, 101–106
Second Derivative Test	4.4	1–54, 63–66	55–62, 67–70	73–75, 77–79, 89–96
Graphing Derivatives	4.5	1–6		
Optimization	4.7	3–16	17–30	39–61
