

Study Guide for Exam 3

1. You are supposed to know how to find the absolute maximum and absolute minimum of a function f defined on the closed interval $[a, b]$, by comparing the values on the end points $f(a), f(b)$ and the values on the critical value(s) $f(c)$'s. You should know what the definition of a critical value is.

2. You are supposed to be able to use the 1st Derivative Test, as well as the 2nd Derivative Test, to find the local maximum and local minimum of a function.

3. You are supposed to know how to use L'Hospital's Rule to compute the limits of the form $\frac{0}{0}, \frac{\pm\infty}{\pm\infty}$, as well as those of the form $\pm\infty \times 0, \infty - \infty$.

4. You are supposed to be able to compute the limits $\lim_{x \rightarrow a} [f(x)]^{g(x)}$ of the form $0^0, \infty^0, 1^\infty$.

5. You are supposed to be able to know how to use the Mean Value Theorem. You should understand some examples, as discussed in the Webassign, where the conclusion of the Mean Value Theorem fails to hold and why.

6. You are supposed to be able to know how to apply this corollary of the Mean Value Theorem to compute some value which is seemingly difficult to determine otherwise: If $f'(x) = 0$ for all values of $x \in (a, b)$, then a continuous function f on the closed interval $[a, b]$ is actually a constant. Look at Example 6 on Page 291 of the textbook.

7. You are supposed to be able to sketch the graph of a function by computing the 1st derivative (increasing or decreasing) and 2nd derivative (concave up or down).

8. You are supposed to be able to determine the intervals where a given function is increasing or decreasing, and where its graph is concave up or down. Make sure you can carry out the calculation, starting from the 1st derivative, all the way up to the 2nd derivative precisely and swiftly. Go over the examples given in the Webassign and the textbook.

9. You are supposed to be able to determine the equation of the slant asymptote of a function.

10. 3 Optimization Problems will be given on Exam 3. Go over all the problems discussed in the Webassign and the examples in the textbook.

11. Look at Problem 21 on Page 292 on the textbook.