

Math 125 Exam 3 Review Sheet

Exam 3 will be on **Tuesday, 4/21**. It will cover Sections 4.1 - 4.7 and 4.9.

I will have additional office hours before the exam: Monday, 4/20, 2-5 p.m. and Tuesday, 4/21, 11:30 a.m. - 12:30 p.m.

No books, notes, or calculators will be allowed on the test. For full credit, solutions of the exam problems must be correct and clearly written, and you must show all your work.

To prepare for the test, read the summary at the end of each section and make sure that you know the main concepts, facts, and methods. If you feel that you do not know the material of a section well, read the book or the class notes. Go over the Hw as needed and take a look at the quizzes. Review the following:

- Linear approximation: If $f(x)$ is differentiable at $x = a$, then for x near a ,
 $f(x) \approx f'(a)(x - a) + f(a)$. Equivalently, for small Δx , $f(a + \Delta x) - f(a) \approx f'(a)\Delta x$.
- Give definitions of absolute maximum/minimum and local maximum/minimum.
- What is a critical point?
- If f is continuous on a closed interval $[a, b]$ then f attains its (absolute) maximum and minimum values on $[a, b]$. How to find these values?
- State the Mean Value Theorem and explain its geometric meaning.
- Suppose that $f'(x)$ is positive / negative / zero for all x in (a, b) .
What does this tell us about f ?
- Suppose that $f''(x)$ is positive / negative / zero for all x in (a, b) .
What does this tell us about f ?
- If c is a critical point for f , then $f(c)$ can be a local maximum, a local minimum, or neither. State the First Derivative Test and the Second Derivative Test for critical points.
- What is an inflection point?
- What is a horizontal asymptote? What is a vertical asymptote? How to find them?
- How to graph a function? Describe the steps. In the case of a rational function, remember to start with the domain and asymptotes.
- Applied optimization: Describe how to solve the problems. Which approach(es) can be used for open and for closed intervals?
- State L'Hôpital's Rule for limits as $x \rightarrow a$ and as $x \rightarrow \pm\infty$.
Don't forget the assumptions.
- What is an antiderivative of f ? Review antiderivatives of the basic functions.
What is the general antiderivative of f ? How do we denote it?