

Midterm 3 Study Guide

Things you need to know how to state/do

1. How to draw the graphs of functions, by identifying critical points, inflection points, intervals of monotonicity and concavity, asymptotes.
2. Applied Optimization problems involving a physical situation with a function to optimize over a bounded or unbounded interval.
3. Describe the formula for Newton's method, the idea behind it, and using it to approximate a solution to an equation.
4. Define what it means to say that a function is an antiderivative of another function.
5. The indefinite integral. Indefinite integrals for standard functions (powers, trigs).
6. Linearity properties of indefinite integrals.
7. Partitions, Sample Points, Riemann Sums, definition of Definite Integral
8. Geometrical computation of basic integrals, e.g. constant, x .
9. Linearity of definite integral.
10. Defining $\int_a^a f(x)dx$ and $\int_b^a f(x)dx$ when $b > a$.
11. Formulas relating to breaking an interval into two pieces (theorem 4 on page 262, and its restatements that we looked at in class).
12. Comparison theorem and its consequence (formula 8 on page 263)
13. Both forms of the fundamental theorem of calculus, statement and usage.
14. The substitution method for both indefinite and definite integrals, and using it to compute integrals.

Things you need to know how to prove

1. The power rule for indefinite integrals.
2. Part I of the fundamental theorem of calculus
3. Part II of the fundamental theorem of calculus