

MIDTERM 1: STUDY GUIDE

This is a rough list of things that you should understand for the first midterm. I have included references to problems in the textbook that you can use to practice. I strongly encourage you to take the problem sets as a guide to what kind of problems will be on the midterm.

- (1) Graphing using calculus (lectures 2, 3 and section 4.1 in text).

- Finding x and y intercepts.
- Finding horizontal asymptotes
- Finding vertical asymptotes
- Finding slanted asymptotes
- Where the first and second derivative are positive/negative.

Problems 7-20, 27-29, 31, 34-26 in Section 4.1 all provide good practice.

- (2) Finding maxima and minima (Lectures 3,4 and sections 4.2-4.4 in text)

- How to find critical points.
- How to classify critical points as local maxima and minima using the first/second derivative.

Problems 5-16, 34, 37-39 in section 4.2, problems 33-39 in section 4.3 provide good practice.

- (3) Antiderivatives (lecture 6 and section 5.1 in text). You should know the antiderivatives of basic functions:

- powers
- basic trig functions (sin, cos, tan)
- exponentials
- logarithms
- You should also understand what the slope diagram means and how to find the antiderivative graphically.

Problems 1-34 in section 5.1 would provide good practice.

- (4) Accumulated change (lecture 6, 7 and sections 5.2 in the text)

- Convert knowledge about a derivative into knowledge about the accumulated change.

Problems 4-8 on problem set 3 are good practice. Now that you know the fundamental theorem of calculus you can also get practice by doing problems 28-30, 33, 34 in section 5.5.

- (5) The definite integral and the fundamental theorem of calculus (lecture 8,9 and section 5.3-5.4 in text)

- Definition of the definite integral in terms of Riemann sums.
- How to use the fundamental theorem of calculus to evaluate definite and indefinite integrals by finding antiderivatives.

Problems 1-16 in section 5.4 provide good practice.

- (6) Integration by substitution (lecture 9 and section 5.5 in text).

- Use integration by substitution to evaluate definite and indefinite integrals.

Problems 1-22 in section 5.5 are good practice.