

MIDTERM 2 STUDY GUIDE

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Midterm 2 takes place on **Friday, July 15th at 11:10 am**, but come early, because we'll get started earlier than that. Also, as usual on Fridays, we'll probably move to the room next to ours (289 Cory). The midterm counts for 20 % of your grade, and covers sections 2.7, 2.8, 3.1 - 3.6. It'll be the easiest exam of the semester! This is the study guide for the exam, and contains **everything** you'll need to know for the exam. It has a lot of problems, but that's mainly to give you extra practice in case you need it, so you don't have to do all of them. The material in **bold I** feel is more important than the rest, so make sure to spend more time on those ones than on the other ones.

Note: Make sure to do exercises 40, 41, and 42 in section 3.5, because you are **guaranteed** to have one of those problems on the exam!

Note: 1.3.4 means 'Problem 4 in section 1.3'

Know how to:

CHAPTER 2: LIMITS AND DERIVATIVES

- **Find the derivative of a function at a given point** (2.7.5, 2.7.6, 2.7.7, 2.7.8)
- Find the equation of the tangent line to a function at a given point (ditto, 2.7.18)
- Express a given limit as a derivative of some function f at a given point a (2.7.31, 2.7.32, 2.7.33, 2.7.34, 2.7.35)
- Show, using the definition of the derivative, whether $f'(0)$ exists (2.7.51, 2.7.52, 2.8.51, 2.8.53)
- **Find the derivative of a function using the definition of the derivative** (2.8.19, 2.8.20, 2.8.21, 2.8.22, 2.8.24, 2.8.25, 2.8.28, 2.8.29)
- Given a graph of f , say where it is not differentiable (2.8.35, 2.8.36, 2.8.37, 2.8.28)

CHAPTER 3: DIFFERENTIATION RULES

- **Differentiate functions using:**
 - Simple rules, i.e. the power rule, sum/difference rule, and $(e^x)' = e^x$ (3.1.3, 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.1.15, 3.1.17, 3.1.21, 3.1.31)
 - Product and quotient rules (3.2.3, 3.2.4, 3.2.5, 3.2.6, 3.2.13, 3.2.14, 3.2.15, 3.2.17, 3.2.19, 3.2.23, 3.2.23, 3.2.26)
 - Trigonometric rules (3.3.1, 3.3.2, 3.3.5, 3.3.9, 3.3.10, 3.3.13)
 - Chain rule (3.4.7, 3.4.8, 3.4.9, 3.4.10, 3.4.13, 3.4.14, 3.4.17, 3.4.19, 3.4.23, 3.4.35, 3.4.29, 3.4.39, 3.4.40, 3.4.42, 3.4.45, 3.4.46)
 - Implicit differentiation (3.5.5, 3.5.6, 3.5.7, 3.5.9, 3.5.11, 3.5.13, 3.5.17, 3.5.19)

Date: Friday, July 8th, 2011.

- Inverse trig functions (3.5.45, 3.5.46, 3.5.47, 3.5.52)
- Derivative of $\ln(x)$ (3.6.2, 3.6.3, 3.6.9, 3.6.10, 3.6.12, 3.6.13, 3.6.19, 3.6.28, 3.6.30, 3.6.49)
- Logarithmic differentiation (3.6.37, 3.6.38, 3.6.41, 3.6.42, 3.6.43, 3.6.45, 4.6.46, 3.6.47, 4.6.50)
- Find equations of tangent lines to a function/curve at a given point point (3.1.33, 3.1.34, 3.2.31, 3.2.32, 3.3.22, 3.3.23, 3.3.24, 3.4.51, 3.4.52, 3.4.53, 3.5.25, 3.5.26, 3.5.27, 3.5.29)
- Find second derivatives (3.1.45, 3.2.27, 3.2.28, 3.2.30, 3.2.41, 3.3.28(a), 3.3.29, 3.4.50, 3.6.23, 3.6.24)
- **Remember to do 3.5.40, 3.5.41, 3.5.42.** One of them is guaranteed to be on the exam!