

MATH 241 MIDTERM 2 STUDY GUIDE

How to prepare for this exam:

1. Look over all of your old homework. Make sure that what you wrote down still makes sense.
2. Redo all of your quizzes. Even if you did them perfectly, redoing them will remind you about the different types of problems.
3. Read over your notes. There are many subtleties that are important to understand. Once you understand these then you understand the material much better.
4. Look over the Review section at the end of chapters 10, 11.

Format for the midterm: **Multiple choice** (please bring pencil #2).

You will not be able to use your notes, or book on the exam. You can use one note card 3×5 inches with any formulas you wish.

Review questions:

- Page 784: 1, 2, 5, 7, 9, 10, 11, 23, 27, 29, 31, 33, 35, 37, 43, 45;
- Page 839: 1, 3, 5, 6, 7, 9, 11, 13, 15, 17, 19, 22, 23, 24.
- Assigned homework exercises

Vocabulary:

- exponential function
- logarithmic function
- natural log
- average rate of change
- secant line through P and Q
- difference quotient
- instantaneous rate of change
- Derivative of $f(x)$ at $x = a$
- Limit of a function of $f(x)$ at $x = a$.
- L'Hospital rule.
- Tangent line to $f(x)$ at $x = a$.
- Product Rule
- Quotient Rule
- Chain Rule
- Implicit differentiation
- Marginal cost
- Marginal revenue
- Marginal profit
- Marginal revenue
- Marginal product
- Average cost

1. CHAPTER 10

Sections 10.1, 10.7, 10.8. Here are some things you should know:

- You need to be able to find the derivative of a function using the limit of difference quotient.

- Know how to use the derivative to find the equation of the tangent line to f at the point $x = a$.
- Know how to compute derivatives using the power, constant multiple, and the sum and difference rules.
- Know how to compute limits using the L'Hospital rule.
- Understand the applications in section 10.8, in particular, the marginal product example given in the text.

2. CHAPTER 11

Sections 11.1, 11.2, 11.3, 11.4. Here are some things you should know:

- You need to know the product, quotient and chain rules and, obviously, how to use them.
- You need to know how to use the above rules in conjunction with one another. i.e. be able to compute the derivative of a quotient of products, the product of quotients, a product of compositions etc. Basically you to be able to figure out which rule to use first etc.
- Know the derivative of $\log_b(x)$ and b^x . If you know these derivatives then you can let $b = e$ to remember the derivatives of $\ln(x)$ and e^x . You should also know the derivative of $\log_b(|x|)$.
- Be able to use the above derivatives to answer questions about rates of change of exponential and logarithmic questions.
- Be able to use the above rules for implicit differentiation.