

MATH 241 MIDTERM 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 1, 9 and 10.

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 93: 3, 5, 7, 8, 9, 14, 15, 21, 23;
- Page 667: 1, 4, 9-11, 13, 15, 19, 21, 25-28, 29, 31, 33-35;
- Page 784: 17, 21, 22, 23, 26;
- Assigned homework exercises

Vocabulary:

- function
- piecewise function
- X and Y intercept
- linear function
- slope
- difference quotient
- point-slope form
- quadratic function
- vertex
- concave up
- concave down
- cost, revenue, profit, supply, demand
- exponential function
- logarithmic function
- natural log
- continuously compounded interest
- half-life
- doubling time
- average rate of change
- tangent line
- instantaneous rate of change
- derivative

1. CHAPTER 1

Sections 1.1, 1.2, 1.3, 1.4. The most important sections are 1.3 and 1.4. Here are some things you should know:

- How to evaluate and graph piecewise functions.
- How to find the X and Y intercepts of a function.
- How to write the equation of a line in point-slope form.
- How to write the cost, revenue, profit, supply and demand functions and use these functions to answer application questions.
- Interpret the meaning of the slope for linear models.

2. CHAPTER 9

Sections 9.1, 9.2, 9.3: quadratic, exponential, and logarithmic models. You should know the basic form of all three models.

- Quadratic Models; basic form: $f(x) = ax^2 + bx + c$, where $a \neq 0$.

Given a quadratic function, be able to find the vertex.

Be able to answer minimum/maximum application questions especially concerning revenue and profit.

Be able to graph a quadratic function and use a graph to answer questions about a quadratic function.

- Exponential Models; basic form: $f(x) = Ab^x$, $b > 0$, $b \neq 1$

Logarithmic Functions; You basically just need to know how to use logarithms to solve exponential equations. Its very important to understand the relationship between $\log_b(x)$ and b^x .

Know the power laws!!

Be familiar with the investment models where interest is compounded continuously, annually, monthly, daily etc.

Know the difference between exponential decay and growth models.

Given two points on an exponential function you should be able to find the function.

Solve exponential equations using logarithmic functions (9.3).

Find doubling time or half-life using growth or decay constants (9.3).

Find the growth or decay constants using doubling time or half-life (9.3).

3. CHAPTER 10

Sections 10.4, 10.5, 10.6. Rate of change and derivative.

- Be able to find the average rate of change of a function over an interval of the type $[a, b]$ or $[a, a + h]$. You should be able to do this for functions given by equations, tables, or graphs.
- Know how to estimate the instantaneous rate of change of $f(x)$ at $x = a$.
- Understand how average rate of change is related to the slope of secant lines of graph.
- Know to the definition of the derivative of a function using as the limit of difference quotient.
- Understand how derivative is related to the slope of tangent lines of graph.