

General Info

Exam 2 is scheduled for **Thursday, Oct 15**. It will cover material from Chapters 2 and 3. Specifically Sections 2.5 through 3.6. There are 18 problems on the exam. The exam is closed book/notes. You may use a calculator as long as it isn't a TI-89 or any other calculator that does algebraic manipulation. You may use the entire class to do the exam. To receive full credit you must show your work.

Chapter 2

From Chapter 2, you should be able to work the type of problems described below which include memorizing and knowing how to apply the following:

1) The Limit Laws

2) A function f is **continuous** at a number a if $\lim_{x \rightarrow a} f(x) = f(a)$ which is proved by showing:

(A) $f(a)$ is defined,

(B) $\lim_{x \rightarrow a} f(x)$ exists (left- and right-hand limits exist and are equal),

(C) $\lim_{x \rightarrow a} f(x) = f(a)$

3) Definition of continuity from the left (or continuity from the right) on a specific interval.

4) Definition of a derivative: $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

5) A function f is **differentiable** at a number a if $f'(a)$ exists. A function f will not be differentiable at the following:

(A) "kink" or "corners" in the graph, where the rate of change of f changes abruptly.

(B) points of discontinuity

(C) vertical tangents

Chapter 3

From Chapter 3 you should be able to work the type of problems below, which include memorizing and knowing how to apply the following:

1) Sum, difference, product and quotient rules for differentiation.

2) Chain rule for differentiation.

3) The derivatives of polynomial, rational, exponential (with any base), logarithmic (with any base), trigonometric and inverse trigonometric functions.

4) Implicit Differentiation

5) Logarithmic Differentiation

Exam 2 Directions

These are excerpts from the actual problems on the test

1) Use algebraic techniques (not tables) to find the exact value of the following limit, if it exists, and then state what the limit means graphically (i.e. the specific hole, point, vertical asymptote or horizontal asymptote).

2) Use mathematical reasoning (not tables) to find the infinite limit, and then state what the graph means graphically (i.e. the specific hole, point, vertical asymptote or horizontal asymptote).

3) The following two limits result in a number. What is the limit of each? Give exact (not approximate) value.

Use given graph to answer questions 4 through 6

- 4) Find each of the following limits if they exist.
- 5) Use the definition of continuity to explain why f , graphed to the right, is discontinuous at each of the following values:
- 6) Name any (if there are any) x -values where the function (graphed above) is continuous but not differentiable. Explain mathematically.
- 7) Sketch a graph of a piecewise defined function.
 - a) Use the definition of continuity to show whether f is continuous or discontinuous at a number. (Saying something about the graph isn't enough)
 - b) Use the definition of left and right continuity to determine whether f continuous from the left, right or neither at 0. (Saying something about the graph isn't enough)
- 8) Use the definition of the derivative of a function to find $f'(x)$ for a given function f
- 9) Use the graph of f to sketch a graph of f' below .
- 10) Sketch a graph of f given the following properties:
- 11) Use the graph of f to sketch a graph of f' .
- 12) Indicate whether each of the following statements is TRUE or FALSE (4 statements)
- 13) Given a position function $s(t)$, answer questions about average velocity, $s'(t)$, $s''(t)$.
For problems 13 through 16, find y' . The functions given will be compositions of polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions. You may need to use any of the differentiation rules and/or logarithmic differentiation.
- 17) Find an equation of the **tangent line** and of the **normal line** to the curve at the given point.
- 18) For what x -values is the tangent line a the curve horizontal?

Chapter 2 Review Problems

True/False Quiz	Page 166	Problems 1–11 all, 13, 17
Exercises	Page 167–168	Problems 1–20 all, 29, 30, 35–37all, 42–44all, 45ab, 47

Chapter 2 Review Problems

True/False Quiz	Page 261	Problems 1–12 all
Exercises	Page 262–264	Problems 1–39 odd, 49, 57–61all, 63ab, 65, 66, 70, 71–78all, 84, 89