Math 5A **Test 3 Prep** **Name:**

General Info

Exam 2 is scheduled for **Thursday, Nov 12th**. It will cover material from Chapters 3 and 4. Specifically Sections 3.7 through 4.5. 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.

Skills

Below are the skills that are incorporated into the problems on the exam. You should know how to:

1) Factor to find roots of an equation.
2) Solve trigonometric equations.
3) Use the fundament trigonometric identities.
4) Find the volume and/or area of any shape.
5) Use the sum, difference, product, and quotient rules for differentiation.
6) Use the chain rule for differentiation
7) Find the derivatives of polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and hyperbolic trigonometric functions.

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

Chapter 4

From Chapter 4 you should be able to work the type of problems below, which include memorizing and knowing how to apply the following:

1) The Closed Interval Method (for finding absolute maxima and minima)
2) The Mean Value Theorem
3) Increasing/Decreasing Test
4) The First Derivative Test
5) Concavity Test
6) The Second Derivative Test
7) L'Hospital's Rule

Exam 3 Directions

These are exerpts from the actual problems on the test

1) A particle moves according to the position function $y = s(t)$, where $s(t)$ is measured in feet and t is measured in seconds.
    a. Find the velocity and acceleration functions
    b. When is the particle moving left? When is the particle moving right?
    c. Draw a diagram illustrating the particle's position. Label at least three times and their corresponding position.
    d. Find the total distance travelled in the time interval $[0,8]$
    e. When is the particle speeding up? When is it slowing down?

2) Related Rates Problem

3) Another Related Rates Problem

4) Linearization Problem
   a. Find the linearization of $y = f(x)$ at a given *value.*
   b. Use the linearization $L(x)$ of the above function to approximate *a given expression*.
   c. Draw a graph of $y = f(x)$ and the linearization $L(x)$, and the **label** the distances: $\Delta x = dx$, Δy and dy.

5) Application Problem:
   a. Use differentials to estimate the maximum error in calculated volume.
   b. What is the relative error in the volume? What is the percentage error in volume?

6) Circle **T** if the statement is true or **F** if the statement is false.

7) Find the absolute maximum and the absolute minimum values of $y = f(x)$ on the given closed interval.

8) Problem involving the Mean Value Theorem:
   a. Verify that the function $y = f(x)$ satisfies the hypotheses of the Mean Value Theorem on the given interval. Then find all numbers c that satisfy the conclusion of the Mean Value Theorem.
   b. Use the graph below of $y = f(x)$ to illustrate the Mean Value Theorem. In other words, find and label the c values you found in part a.

9) Sketch a graph of a function that satisfies all of the given conditions. *Given conditions will include information about the first and second derivatives, function values and limits.*

10) The graph of the first derivative f' of a continuous function f is shown.
   a. State the intervals on which f is increasing (or decreasing).
   b. At what values of x does f have a local maximum or local minimum?
   c. On what intervals is f concave up or concave down?
   d. What are the x –coordinates of the inflection points of f ?
   e. Sketch a possible graph of f .

11) Find the limit. *The limits given will be of an indeterminate form. You may have to change it's form, use a logarithm and/or use L'Hospital's Rule.*

12) **Sketch the curve** $y = f(x)$**.**
   a. State the domain of f .
   b. State the y –intercept of f .
   c. State the x –intercept(s) of f .
   d. State the intervals on which f is increasing (decreasing)
   e. State the intervals on which f is concave up (concave down)
   f. State if applicable, any local maxima.
   g. State if applicable, any local minima.
   h. State if applicable, any point(s) of inflection.
   i. State if applicable, any asymptotes.

Chapter 3 Review Problems

True/False Quiz	Page 261	Problems 1–12 all
Exercises	Page 262–264	Problems 43,45,63,97,98,99,101–105all

Chapter 4 Review Problems

True/False Quiz	Page 347–348	Problems 1–10 all
Exercises	Page 348–350	Problems 1–5 odd, 7–18 all, 19, 25, 27, 33, 47, 53, 58