Math 122 (Section 1) **Final Exam Review Sheet**

Our final exam is Monday, December 6, from 9:00 AM – 12:00 PM in LeConte 412. I think that the best way to study is to first look at your tests, then your quizzes, then the homeworks. Here is the list of topics on the final exam.

Chapter 1

1.1 Be able to compute the total change or the average rate of change for various quantities which may be given as a table, a graph, or a paragraph. Look at #1,4,7,12,13,14 from section 1.1.

1.2 Be able to answer questions about a function given as a table, a graph, or a formula. Look at #7,10,13,14 from section 1.2.

1.3 If you are given two points, you should be able to find the equation of the line through those points. If you are given a table of values for a function, you should be able to recognize whether or not that function could be linear, and, if so, then find a formula for the function. If you are given a paragraph describing a linear function, you should be able to find a formula for the function. You should understand the terms *slope* and *intercept*. You should be able to compare slopes or average rates of change when looking at a graph. You should be able to compute average rates of change from a formula for some function. Look at #1,3,4,7,8,9,16,20,21,22 from section 1.3.

1.4 You should understand the terms *cost*, *revenue*, *profit*, *break-even point*, *fixed costs*, *marginal cost*, and *marginal revenue*. Before you can answer questions about these quantities, you will often have to come up with a formula for cost or revenue given a verbal description. Look at #1,2,3,5,6,8,10 from section 1.4.

1.6 You should understand the terms *exponential growth*, *exponential decay*, *half-life*, *doubling time*. If you are given a table of values for a function, you should be able to decide whether or not that function could be exponential. If so, you should be able to fill in missing values from the table and come up with a formula for that function. Recall that all exponential functions can be written in the form $P = P_0 a^t$. If you are given that some quantity grows or shrinks by a certain percent each year, then you should be able to come up with a formula for that quantity. Look at #1,2,5,7,13,15,16,18,20,25 from section 1.6.

1.7 Be able to answer questions involving interest compounded annually or interest compounded continuously. Look at #1–11 from section 1.7.

1.8 Be able to use the rules of natural logarithms correctly. You may need to do this when solving problems involving exponential functions such as the problems found in sections 1.6 – 1.9. Look at #3–17,33,34,37,38,40 from section 1.8.

1.9 Be able to answer more questions about exponential functions. Look at #1,6,8,10,11,12,14,15,17,20 from section 1.9.

Chapter 2

2.1 Given some function $P = f(t)$, you should be able to do the following:

1. Compute total change in P between $t = a$ and $t = b$;

2. Compute the average rate of change of P between $t = a$ and $t = b$;
3. Compute the (instantaneous) rate of change of P at some point $t = a$.
4. From a graph, determine where the slope is positive, negative, or zero. Also determine where you have the greatest and least slopes.

Be sure to include correct units for (1)—(3) above. Look at #1,3,5,6,7,10,11,12,13 from section 2.1.

2.2 Given a function $y = f(x)$, $f'(a)$ denotes the derivative of f at the point $x = a$. All three of the following mean the exact same thing.

- the derivative of f at a
- the rate of change of f at a
- the slope of the graph of f at a

Since we've already dealt with slope and rate of change in 2.1, most of the problems in 2.2 are very similar. They simply use the new notation $f'(a)$. This section also talks about the graphical interpretation of total change, average rate of change, and rate of change at a point. You may be given the graph of $f(x)$ along with two points $x = a$ and $x = b$. You should understand the graphical meaning of $f(b)$, $f(a)$, $b - a$, $f(b) - f(a)$, $\frac{f(b)-f(a)}{b-a}$, and $f'(a)$. Look at #1,2,3,6,9,11,16 from section 2.2.

2.3 Given a function $y = f(x)$, we learned how to compute $f'(a)$ at any point $x = a$. So we see that $f'(x)$ is itself a function. Given a graph of $f(x)$, you should be able to sketch a graph of $f'(x)$. Remember that in the graph of $f'(x)$, the $y - values$ are just recording what the slopes are in the graph of $f(x)$. Another problem may give you information about $f'(x)$ and ask you to sketch a graph of $f(x)$. Knowing where f' is positive, negative, or zero tells you where f is increasing, decreasing, or constant - this enables you to sketch a graph of $f(x)$. Look at #1,13,15,17,18,26,27,28,32 from section 2.3.

2.4—2.6 See Exam 3 Review Sheet.

Chapter 3

3.1—3.5 See Exam 3 Review Sheet.

Chapter 4

4.1—4.4 See Exam 4 Review Sheet.

Chapter 5

5.1—5.3 See Exam 4 Review Sheet.

Chapter 6

6.1 Be able to find the average value of a function on a specified interval. If you are given a formula, then you should be able to use definite integrals to obtain an exact answer. If you are given a graph, then you should be able to quickly approximate the average value. Look at #1,2,3,4,5,6,7,8,10,11,13 from section 6.1.

6.5—6.6 See Exam 4 Review Sheet.