Math 122 (Section 9) **Test 2 Review Sheet**

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 $f(x)$ at the point $x = a$. All three of the following mean the exact same thing.

- the derivative of $f(x)$ at $x = a$
- the rate of change of $f(x)$ at $x = a$
- the slope of the graph of $f(x)$ at $x = a$

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 $f(b)$, $f(a)$, $b - a$, $f(b) - f(a)$, $\dfrac{f(b) - f(a)}{b - a}$, 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 $f'(x)$ is positive, negative, or zero tells you where $f(x)$ 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 In this section you are asked to give the practical meaning of statements such as $f(8) = 100$ and $f'(8) = 4$. Knowing the units for $f(x)$ and $f'(x)$ makes this easier to do. You should also be able to use the above information to approximate $f(9)$, $f(8.1)$, $f(7.3)$, etc. Look at #1, 2, 8, 10, 11, 12, 15, 17 from section 2.4.

2.5 Graph a function which is increasing (or decreasing) at an increasing, decreasing, or constant rate. Look at a graph or table of values for $f(x)$ and answer questions about $f(x)$, $f'(x)$ or $f''(x)$. If the graph of $f(x)$ is concave up (or down) on an interval, then know what this tells you about $f''(x)$ on that interval. Look at #1, 2, 3, 4, 5, 8, 15, 16 from 2.5.

2.6 Given a cost function and a revenue function, be able to compute marginal cost, marginal revenue, and profit. Know the connection between maximum profit and these marginal quantities. Know the practical meaning of these marginal quantities. Look at #1, 2, 3, 6, 9, 10, 11, 12, 13 from section 2.6.

Notes

- You should look over the material from quiz #5, 6, and 7.
- You should bring a graphing calculator and be able to use it effectively. For graphing functions, you will have to decide the appropriate [WINDOW] and be able to use the [TRACE] feature. You should also be proficient at using the built-in features found under [2nd] – [CALC] for the TI-82 and TI-83. For the TI-85 and TI-86, use [RANGE] to enter the appropriate viewing window, and look for the built-in features under [GRAPH] – [MORE] – [MATH].
- There will be a review session Tuesday, March 20th from 8:00 PM until 10:00 PM in LeConte 412.