

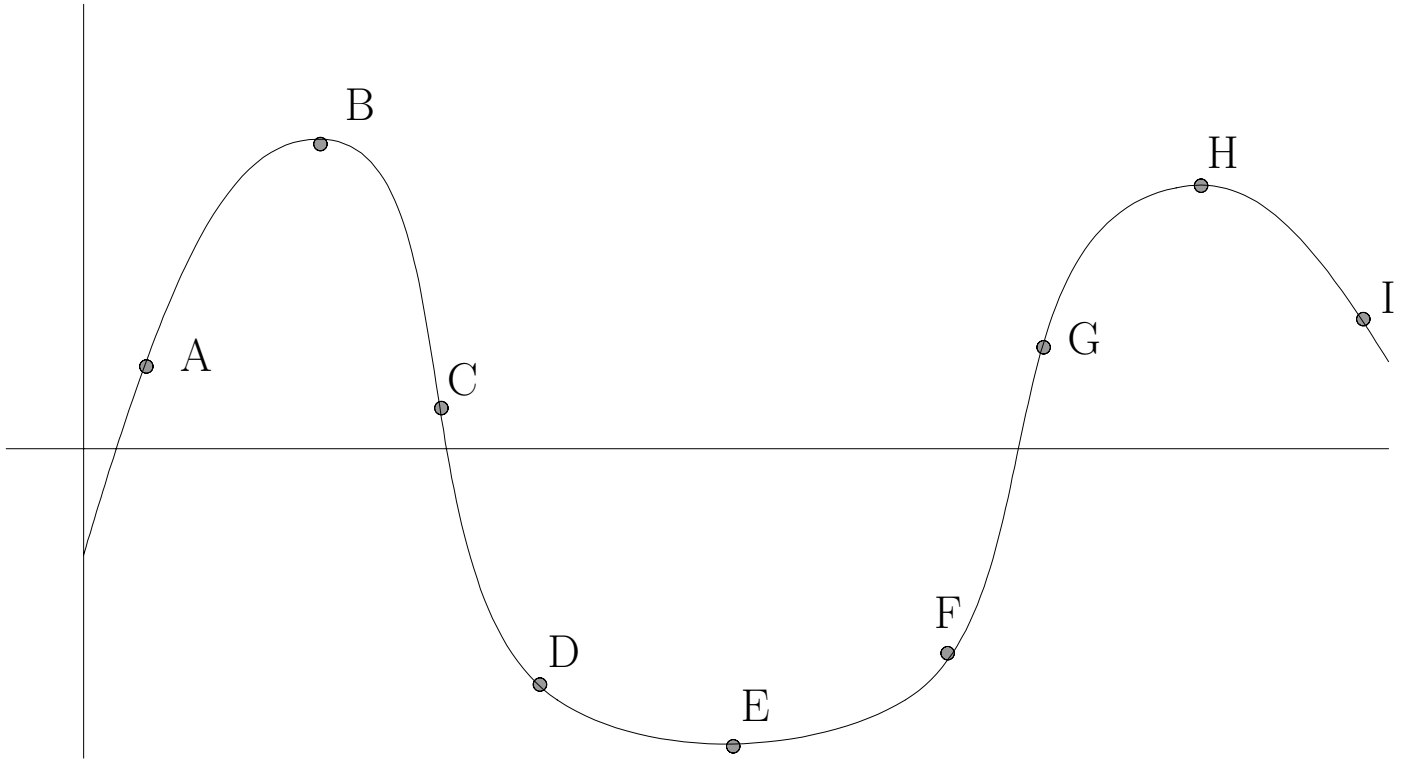
Mathematics 122 Test #2

Name: _____

You are to use your own calculator, no sharing.

Show your work to get credit. This means that if you use your calculator to solve a problem, then you have to write a sentence telling how you used it to do the calculations. (That is if you graphed it and zoomed in then say that is what you did etc.

1. (10 Points) Let $f = f(x)$ have the following graph.



(a) At which of the labeled points is $f'(x) > 0$?

(b) At which of the labeled points is $f'(x) < 0$?

(c) At which of the labeled points is $f'(x) = 0$?

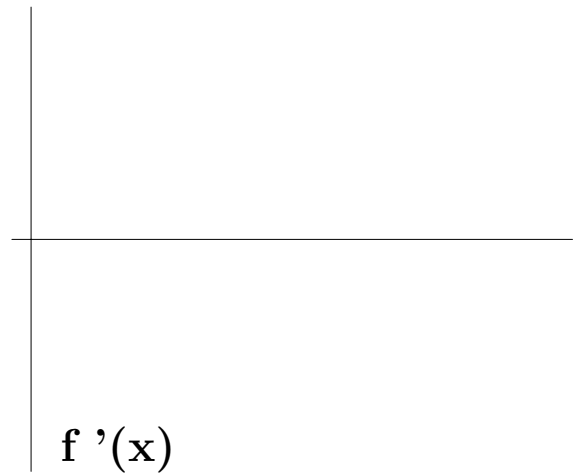
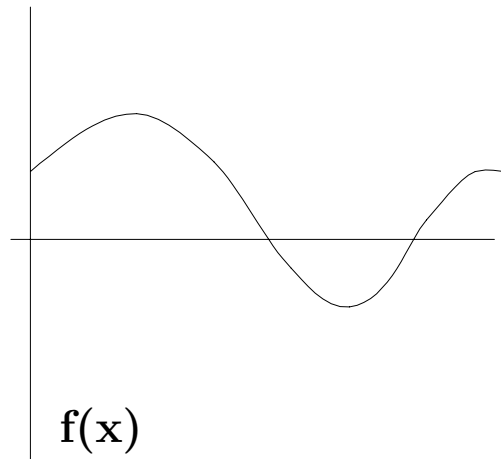
(d) At which of the labeled points is $f(x)$ largest?

(e) At which of the labeled points is $f'(x)$ largest?

2. (5 points) Let $f(t) = \frac{\sqrt{1+2^t}}{3+t^2}$. Use your calculator to estimate $f'(1.5)$

$f'(1.5) \approx$ _____

3. (10 Points) Below is the graph of $y = f(x)$. Sketch the graph of $y = f'(x)$.



4. (15 Points) Draw the graph of a smooth (i.e. no corners) function $y = f(x)$ so that

-
- $f'(x) < 0$ for $-1 < x < 1$
- $f'(x) > 0$ for $1 < x < 3$
- $f'(x) < 0$ for $3 < x < 5$
- $f(1) = -2$
- $f(3) = 4$

5. (15 Points) Draw Graphs of functions that satisfy the following:

(a) Is increasing at an decreasing rate.

(b) Is decreasing and concave up.

(c) Has $f'(x) > 0$ and $f''(x) < 0$

(d) has $f''(x) > 0$ and $f'(1) = 0$.

6. (15 Points) Let the function $u = f(t)$ have its values as in the following table:

t	0.0	0.2	0.4	0.6	0.8
$f(t)$	0.000	0.192	0.345	0.441	.488

(a) What is that average rate of change of f on the interval from $t = 0.2$ to $t = 0.8$?

(b) What is an estimate for $f'(0.8)$?

(c) What is a good estimate for $f(0.9)$?

(d) What is a good estimate for $f''(0.4)$?

7. (15 Points) A car goes at 50 mph for 1 hour, slows down to 30 mph for 45 minutes, and then speeds up to 70 mph for an hour.

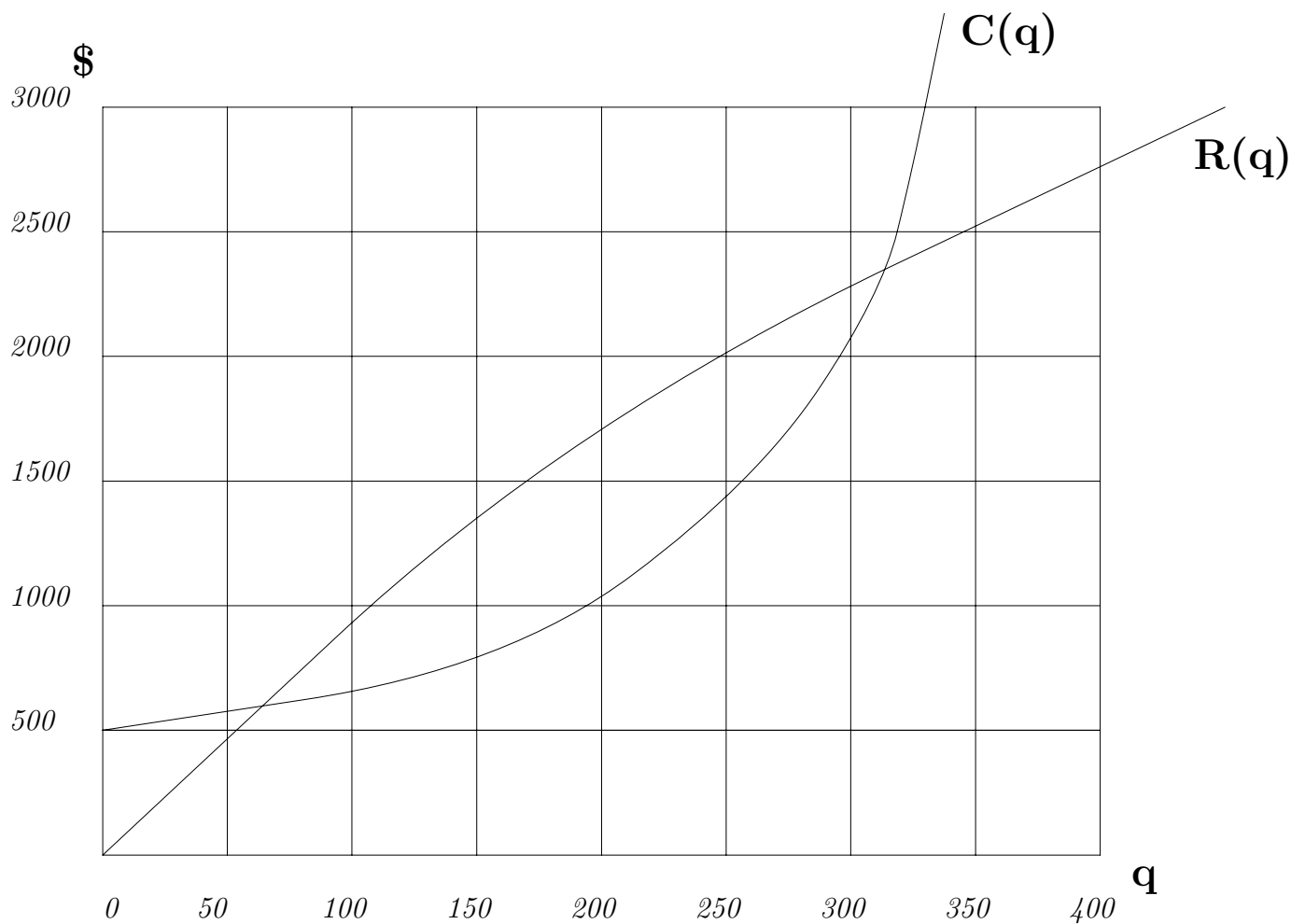
(a) Graph the speed of the car as a function of time.

(b) What is the total distance covered by the car?

(c) What is the distance covered in the first hour of the trip?

(d) Graph the distance covered as a function of time.

8. (15 Points) A group of students decide to market a booklet on highlights of the 1998 Gamecock football season. The following graph shows the cost, $C(q)$, and the revenue, $R(q)$, from producing a quantity q of the booklets.



- (a) About how much were the startup costs of the for producing the booklet?

- (b) From the graph roughly how much is the marginal revenue $R'(100)$ of producing 100 booklets?

- (c) If the students are producing 300 booklets then is it in their interests to produce more booklets? Write a sentence or two explaining your answer.

- (d) Make a guess the number of booklets they should product to maximize their profit.
