Math 122 (Section 9) **Quiz 5** **February 27, 2001**

Name _____

You must show all of your work to receive credit for a correct answer. You are not allowed to borrow another student's calculator during the quiz.

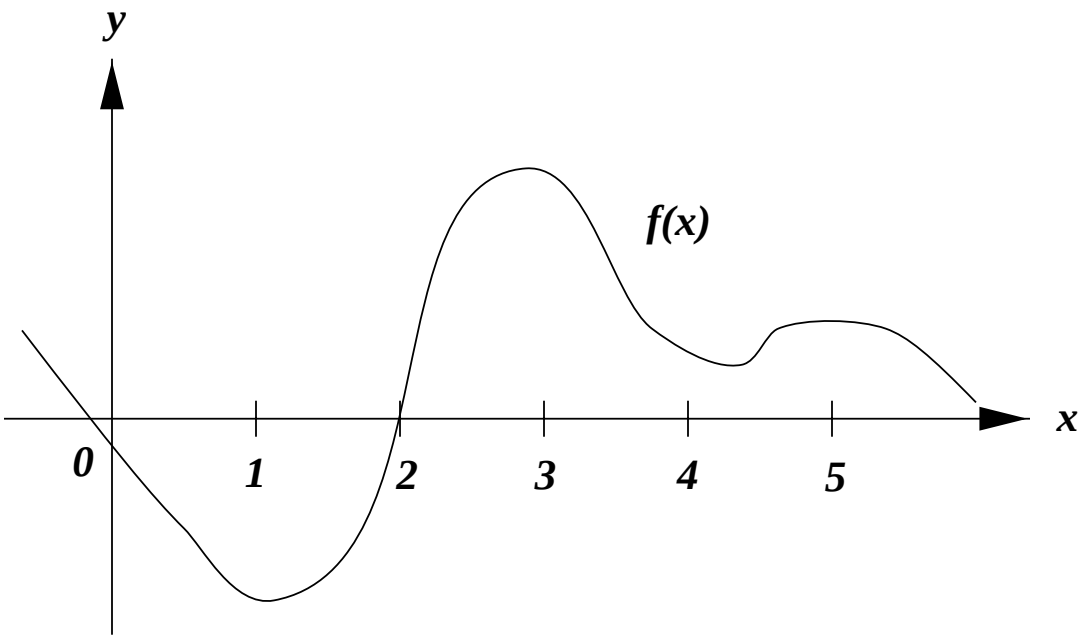
Be sure to include proper units for problems $1a, 3b,$ **and** $3c$**.**

1. (3 points) It recently took Andy 3 hours to run a 21-mile race. He was running at a quick constant speed for the first hour, but from that point on his speed was decreasing for the rest of the race.

   (a) What was his average speed during this race?

   (b) Carefully sketch a graph of Andy's total distance traveled as a function of time. Your graph should include the coordinates for the lowest point as well as the highest point on the graph, and should clearly have the correct shape.

2. (3 points) Use the graph of $f(x)$ given below to answer the following questions.



(a) Which is largest: $f(1)$, $f(2)$, $f(3)$, $f(4)$ or $f(5)$?

(b) Which is largest: $f'(1)$, $f'(2)$, $f'(3)$, $f'(4)$ or $f'(5)$?

(c) Which is larger: $\dfrac{f(5)-f(2)}{5-2}$ or $f'(5)$?

3. (4 points) A biologist studied the growth of a rabbit population in a field. She found that the number of rabbits was approximated by the function $R(t) = 20 + 25t(0.92)^t$ where t represents the number of weeks since the start of her research.

   (a) Sketch a graph of the rabbit population during the first 52 weeks of her research.

   (b) What was the average rate of change in the rabbit population during the first five weeks of her research?

   (c) Estimate $R'(26)$. In other words, estimate the rate at which the rabbit population was changing 26 weeks after she first began her research?

   (d) Estimate the value of t for which $R'(t) = 0$. Give your answer to the nearest integer.