

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 112 A
Midterm I
February 5, 2008

Problem 1	12	
Problem 2	10	
Problem 3	15	
Problem 4	13	
Total:	50	

- You are allowed to use a calculator, a ruler, and one sheet of notes.
- Your exam should contain 5 pages in total and 4 problems. Make sure you have a complete test.
- Unless otherwise instructed, you **must show how you get your answers**. Correct (or incorrect) answers with no supporting work may result in little or no credit.
- If an algebraic method is available, answers obtained by guessing, approximating, or plug-and-check will get little or no credit.
- If you need more room, use the backs of pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

GOOD LUCK

Do you want me to post your grades so far on the class website under the last 4 digits of your STUDENT ID (in about a week)?

Yes, please post my grades. Sign to give permission: _____

No, please don't post my grades.

1) (12 points) Show your work.

a) Find $f'(x)$, if $f(x) = 5(1 - 2x)^2$.

Answer: $f'(x) =$ _____

b) Find $\frac{dy}{dx}$, if $y = 3\sqrt[5]{x} + \frac{2}{x^3} - 3$. You do not need to simplify your answer.

Answer: $\frac{dy}{dx} =$ _____

c) The derivative of a certain unknown function $g(x)$ is $g'(x) = \frac{x^2}{x+1}$. Use this fact to approximate the value of

$$\frac{g(5.002) - g(5)}{0.002}$$

Answer: $\frac{g(5.002) - g(5)}{0.002} \approx$ _____

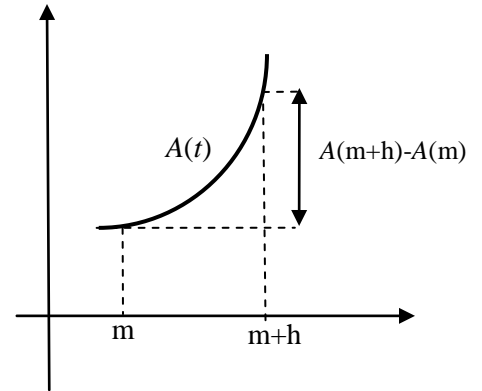
2. (10 points)

To the right is a rough sketch of part of the graph of a function $A(t)$.

We are not given a formula for $A(t)$, but we are told instead that:

$$A(m+h) - A(m) = \frac{2mh}{(m+1)(m+h)}$$

- a) Compute the slope of the secant line to the graph of $A(t)$ from $t = 1$ to $t = 5$.

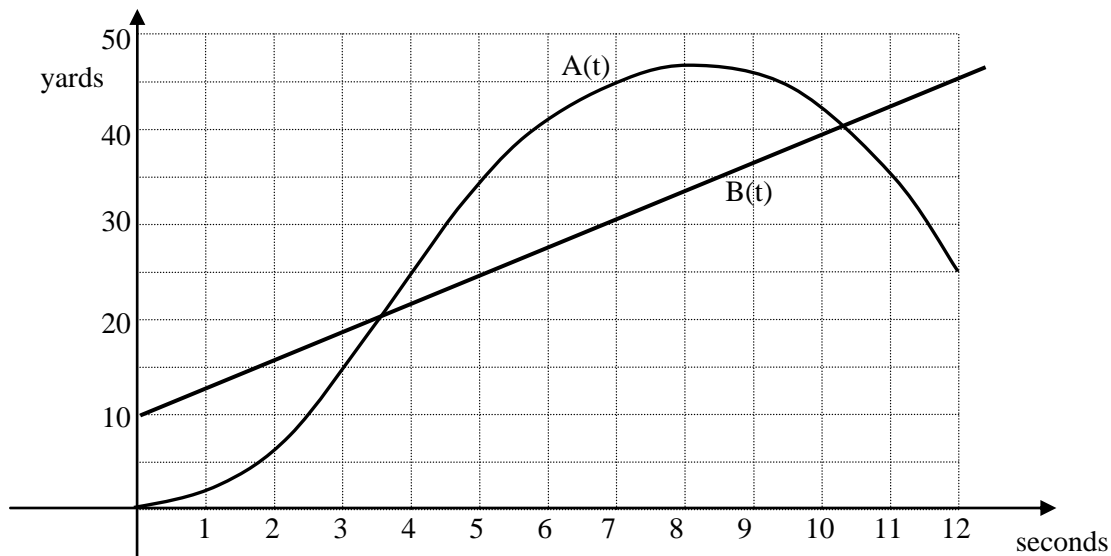


Answer: _____

- b) Find a formula in terms of t for $A'(t)$. Show all your steps.

Answer: $A'(t) =$ _____

3. (15 Points) The two graphs below are of **distance** vs. time for two cars, car A and car B.



a) What is the speed of car A at $t=5$ seconds?

Answer: _____ yards/second

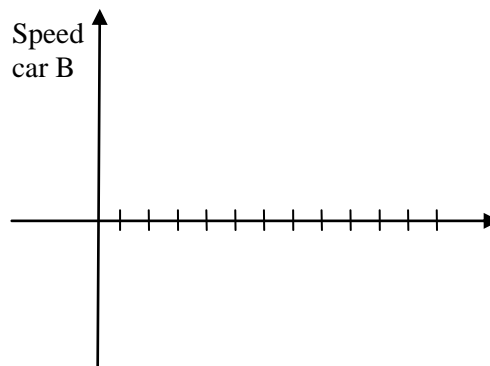
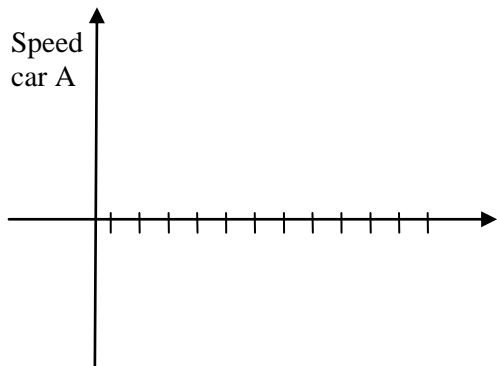
b) Find a 2 second time interval during which the **average** speed of car A is 4 yards/second.

Answer: From $t=$ _____ to $t=$ _____ seconds.

c) Find the longest time interval during which car A is ahead of car B, but car A drives slower than car B.

Answer: From $t=$ _____ to $t=$ _____ seconds.

d) Sketch the **speed** graphs of the two cars. Compute and label the y and x-intercepts, and sketch the general shape of each of the two graphs.

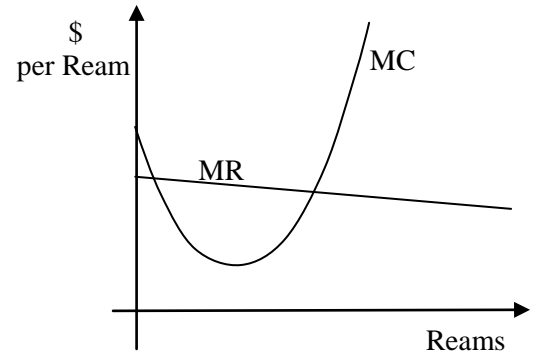


4. (13 Points) A print shop produces and sells Reams of paper. The Marginal Cost and Marginal Revenue (in dollars per Ream) for producing q Reams are given by:

$$MR(q) = 5 - 0.04q$$

$$MC(q) = 0.2q^2 - 1.2q + 6$$

- a) What quantity results in the greatest profit?
Round your answer to the nearest whole number of Reams.



Answer: $q =$ _____ Reams

- b) What is the lowest value of the marginal cost?

Answer: Lowest value of MC is _____ dollars

- c) The print shop starts selling its paper by the Page instead of by the Ream. One Ream consists of 200 Pages. What is the revenue from selling the 201st Page? (in this question, pay attention to all your units!)

Answer: _____ dollars per Page