

MATH 234 AL1 QUIZ #8

TUESDAY, OCTOBER 30TH, 2007, 9AM

Name: _____

Show all work for full credit.

Problem 1 (2 pts each). A particular model from psychology suggests that when a person is asked to recall a set of facts, the number of facts recalled after t minutes is given by the function

$$Q(t) = A(1 - e^{-kt}),$$

where k is a positive constant and A is the total amount of relevant facts in a person's memory.

- (1) How many facts does the person know initially? (Leave your answer in terms of A and k if needed.)
- (2) Find the derivative $Q'(t)$.
- (3) What is the number of facts that the model predicts a person will remember in the long run, i.e. as $t \rightarrow \infty$?
- (4) Suppose for a particular person who memorizes 10 facts initially, the experimenters find that the person is able to recall 5 facts 15 minutes later. Find k .

Problem 2 (2 pts each). Calculate the derivatives of the following functions.

- (1) $f(x) = x^3 e^{2x}$.
- (2) $g(x) = (\ln x^2)^2$