

Business Calculus Test 3 Review

Dr. Graham-Squire, Summer Session 1, 2012

•The test will cover sections 4.4, 4.5, 5.1-5.6, and 6.1.

•To study, you should look over your notes, rework HW problems on WebAssign, quizzes, and problems from the notes, as well as work out the practice problems given for each section. You can also look at the old tests on my website, the Test 3 should roughly match our test 3. The Review Questions at the end of Chapters 4 and 5 are also good practice (only the optimization questions from the review at the end of chapter 4).

•Calculators are allowed on this test, but for certain questions you may not be allowed to use a calculator. It is highly recommended that you bring a calculator because you cannot use cell phones or computers during the test.

•Some Practice Problems to work on:

1. Find the absolute maximum and minimum (if they exist) of the function $g(x) = x\sqrt{4 - x^2}$ on the interval $[0,2]$.
2. A rectangular box is to have a square base and a volume of 20 ft^3 . If the material for the base costs 30 cents/ ft^2 , the material for the top costs 20 cents/ ft^2 , and the material for the sides costs 20 cents/ ft^2 , determine the dimensions of the box that give a minimum cost. Check your answer to make sure it is a minimum.

3. The number of internet users in China is approximated by the function

$$N(t) = 94.5e^{0.2t} \quad (1 \leq t \leq 6)$$

where $N(t)$ is measured in millions and t is years with $t = 1$ being 2005.

- (a) How many users are there in 2010?
 - (b) When did the number of users equal 190,300,000?
4. Expand and simplify the expression $\ln \frac{x^2 \cdot e^3 x}{\sqrt{x}(1+x)^2}$.
 5. Find the interest rate needed for an investment of \$4000 to double in 5 years if interest is compounded continuously.
 6. Find $f'(x)$ if $f(x) = \ln \frac{e^{3x} + 4}{8}$.
 7. The percentage of alcohol in a person's bloodstream t hr after drinking 8 fluid oz of whiskey is given by

$$A(t) = 0.23te^{-0.4t}$$

- (a) How fast is the percentage changing after 1 hour? After 4 hours?
 - (b) Use calculus to find at what value of t is the percentage at a *maximum*. What is the percentage at that time?
8. Use logarithmic differentiation to find $f'(x)$ if $f(x) = x^{2x}$.

9. The element Grahamsquireium has a half-life of 250 years. Given a 100 gram sample, how much of it will be left after 300 years?
10. Find the indefinite integral $\int x \left(\sqrt{x} + \frac{3}{x^2} - \frac{2e^x}{x} \right) dx$.