

Business Calculus MiniTest 4 Review Answers

Dr. Graham-Squire, Fall 2012

1. Find $f'(x)$ if $f(x) = \ln \frac{e^{3x} + 4}{8}$.

Ans: $f'(x) = \frac{3e^{3x}}{e^{3x} + 4}$.

2. 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? 0.0925

After 4 hours? -0.0279

(b) Use calculus to find at what value of t is the percentage at a *maximum*. When $t = 2.5$.

What is the percentage at that time? 0.21 (Way above the legal limit of 0.08).

3. Use logarithmic differentiation to find $f'(x)$ if $f(x) = x^{2x}$.

Ans: $f'(x) = x^{2x}(2 \ln x + 2)$.

4. 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?

Ans: 43.53 grams.

5. Find the indefinite integral $\int x \left(\sqrt{x} + \frac{3}{x^2} - \frac{2e^x}{x} \right) dx$.

Ans: $\frac{2}{5}x^{5/2} + 3 \ln x - 2e^x + C$

6. Find the indefinite integrals:

(a) $\int x^2(2x^3 + 3)^4 dx$.

Ans: $\frac{1}{30}(2x^3 + 3)^5 + C$. Let $u = 2x^3 + 3$.

(b) $\int \frac{1}{x(\ln x)^2} dx$. Let $u = \ln x$.

Ans: $-(\ln x)^{-1} + C$