

NAME _____

Math 12
Test 3
Fall 2011

You have 50 minutes to complete this test. You must *show all work* to receive full credit. Work any 6 of the following 7 problems. Clearly **CROSS OUT** the problem you do not wish me to grade. Each problem is worth 16 points, and you get 4 points for free, for a total of 100 points. The answers will be posted on the electronic reserves tomorrow.

1. Solve $x^2 y' + \frac{1}{y^2} = 0$ if $y = 2$ when $x = 1$.

2. Find $f'(x)$ for the following functions. DO NOT simplify!

(a) $f(x) = \frac{4e^{3x}}{xe^{x-1}}$

(b) $f(x) = \frac{\ln x}{\sqrt{x}}$

3. Find the balance in an investment account of \$4000 for 5 years at the annual rate of 11% compounded monthly.

4. a) Simplify $\log_2 \left[\ln(\sqrt{7+e^2} + \sqrt{7}) + \ln(\sqrt{7+e^2} - \sqrt{7}) \right]$.

b) Solve for x : $\log_x(2x+3) = 2$.

c) Solve for x : $3^{4x} = 9^{x+1}$.

5. For the function $f(x) = \frac{e^x + e^{-x}}{2}$, list all intervals of increase and decrease, all maximum and minimum *points*, intervals where the function is concave up and concave down, all inflection *points*, and all asymptotes (or say there are none). Then sketch the graph of the function.

6. Evaluate the following integrals:

a) $\int (x^e + e^x) dx$

b) $\int e^{x^2 + \ln x} dx$

7. Solve $\int \frac{\ln x}{x^2} dx$