## HOMEWORK 6 - MATH 112 DUE DATE: Monday, March 14 INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

## GOOD LUCK!!

- 1. Use the three-value tables to graph on the same system of coordinate axes the functions  $f(x) = 3^x$  and  $g(x) = \log_3 x$ .
- 2. Use your knowledge of the basic graphs of logarithms and of graphing techniques to roughly sketch the graph of the function  $f(x) = -\log_{1/4} (x-2)$ .
- 3. Consider the function  $f(x) = \ln \frac{3x(x+1)}{(2x+1)^3}$ .
  - (a) Find the domain of f(x).
  - (b) Expand the formula as a sum, difference or multiple of logarithms.
- 4. Solve the equations
  - (a)  $7 + 2e^{3x} = 13$
  - (b)  $9 + 5 \ln x = 24$
- 5. Find the derivatives of the following functions:
  - (a)  $f(x) = \ln [(1 x^2)^{3/2}]$ (b)  $f(x) = \frac{\ln x}{x^2}$
  - (c)  $f(x) = \ln \sqrt[3]{\frac{x-1}{x+1}}$
  - (d)  $f(x) = \ln \frac{1+e^x}{1-e^x}$
- 6. Find  $\frac{dy}{dx}$  if

(a) 
$$x^2 - 3\ln y + y^2 = 10$$

(b) 
$$4xy + \ln(x^2y) = 7$$

7. Find the equation of the tangent line to the graph of  $f(x) = \frac{\ln x}{x}$  at the point  $(e, \frac{1}{e})$ .

- 8. Compute the derivatives of:
  - (a)  $f(x) = \log_3 (x^3 + 4x)$ (b)  $f(x) = 6^{5x^2}$ (c)  $f(x) = x^3 \cdot 7^{4x}$ (d)  $f(x) = \frac{\log_2 (x-1)}{x^2+1}$