

HOMEWORK 7 - MATH 111

DUE DATE: Monday, November 21

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Evaluate the following without using a calculator:

(a) $\log 0.0001$

(b) $\log_{1/9} 27$

(c) $\log_6 \frac{1}{216}$

(d) $\ln \frac{1}{e^2}$

2. Use the logarithmic identities (product, quotient and power) to expand or contract the following logarithmic expressions, as appropriate.

(a) $2 \log u + 3 \log w - 6 \log v$

(b) $3 \ln(3x + 2) + 2 \ln(x + 1)$

(c) $\log(5x^2y^3)$

(d) $\log_4 \left(\frac{\sqrt{xz}}{w^3} \right)$

3. Graph on the same system of coordinate axis the functions $f(x) = 2^x$ and $g(x) = \log_2 x$.

4. Find the domains of the following functions:

(a) $f(x) = \log_{13}(x^2 - 7x + 10)$

(b) $g(x) = \log_{2005} \left(\frac{x^2 - 4}{x + 5} \right)$

5. Use transformations to sketch the graph of the function $f(x) = \log_5(x - 2) - 1$.

6. Solve the following equations:

(a) $\log_2(x + 9) - \log_2 x = \log_2(x + 1)$

(b) $\log_6(x + 2) - \log_6 \left(\frac{x-7}{5} \right) = 1$

7. Solve the following exponential equations:

(a) $3^{x^2-4x} = \frac{1}{81}$

(b) $5^{3x+5} = 25^4$

8. Solve the following equations:

(a) $6^x = 3^{2x-1}$

(b) $5^{6x-3} = 2^{4x+1}$

(c) $\log_2(\log_2 x) = 1$

(d) $\log x = \sqrt{\log x}$