MATH 1010-2: QUIZ 12

December 9, 2010

TO RECEIVE CREDIT FOR YOUR SOLUTIONS ON PROBLEM 4 YOU MUST SHOW YOUR WORK.

1. (2 points) Evaluate:
$$\log_5\left(\frac{1}{125}\right) = -3$$
(since $5^{-3} = \frac{1}{125}$).

2. (2 points) Evaluate:
$$\log_3(-3) = \text{does not exist}$$
(since 3 raised to any power is positive).

3. (2 points) Evaluate:
$$\log_2(12) - \log_2(3) = \log_2(12/3)$$
$$= \log_2(4)$$
$$= 2$$
(since $2^2 = 4$).

4. (4 points) Let $f(x) = 2\ln(x^2 + 1)$ and $g(x) = \sqrt{e^x - 1}$. Compute $(f \circ g)(x)$.

Solution. We have
$$(f \circ g)(x) = f(g(x))$$
$$= f(\sqrt{e^x - 1})$$
$$= 2\ln\left((\sqrt{e^x - 1})^2 + 1\right)$$
$$= 2\ln(e^x - 1 + 1)$$
$$= 2\ln(e^x)$$
$$= 2x.$$