Math 115 Practice Exam 2
October 17, 2016

Read all instructions before beginning. In all problems you are required to show your work and provide any necessary explanations to receive credit. No calculators or cellphones are allowed.

Also.. have fun and good luck!

QUESTION	SCORE
1	
2	
3	
4	
5	
6	
TOTAL	

1 (a): (5 points) Answer the following true or false questions.

_____ **(a)** $\ln\left(\sqrt{3}\right) = \frac{\ln(3)}{2}$

_____ **(b)** If a function is one-to-one then it is invertible.

_____ **(c)** $\ln(e^x) = x$ for any real number x.

_____ **(d)** The function $f(x) = \frac{1}{\sqrt{x-3}}$ is a rational function.

_____ **(e)** The graph of $f(x) = x^3 + 1$ has three x-intercepts.

1 (b): (6 points) Find all possible rational zeros. Be sure to show all of your work.

$$f(x) = x^3 - 9x^2 + 26x - 24$$

2: (9 points) Which of the following represents a function? Circle all that apply.

$$x^2 + y^2 = 1$$

$$h = \{(1,2), (5,6), (3,2)\}$$

$$f(x) = x^3$$

3: (10 points) Let $f(x) = \sqrt{4 - x^2}$ **and** $g(x) = 3x + 7$. **Evaluate the following.**

(a) $f \circ g(x)$

(b) $f \circ f(x)$

4): (10 points) By completing the square, write $f(x) = x^2 + 6x - 4$ in vertex form and state the vertex. Sketch a rough graph of the function.

5: (10 points) Sketch the graph of the following. Be sure to mark all zeros, and describe the behavior of the function around each zero. Additionally, describe what happens as $x \to \infty$ and $x \to -\infty$.

$$y = x^3 - 3x + 2$$

6: Answer the following.

(a) (5 points) Rewrite the following:

$$\ln\left(\frac{(x-1)^2}{z^{3/2}}\right)$$

Find all asymptotes of the following.

(b)(5 points) $f(x) = \frac{x+3}{x^2-1}$

(c)(5 points) $g(x) = \frac{x^2-1}{x}$