Name:
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 3 – November 2019

Directions: You will find 13 problems listed below. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed. You have one hour to complete this exam.

# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	TOTAL

1. (6 points) Find the domain of the function $f(x) = \log(4x + 3)$.

2. (6 points) Solve: $5 + 4e^{(x+1)} = 13$. Leave answers exact (in other words, don't use a calculator).

3. (6 points) Using the values $\log(a) = 10$ and $\log(b) = 2$, find $\log\left(b^2\sqrt{a}\right)$.

4. (6 points) Solve: $3\log_4(5x - 2) - 1 = 8$. Leave answers exact (in other words, don't use a calculator).

5. (8 points)

(a) Rewrite using the base b via the change of base formula:

$\log_R(M) =$

(b) Condense into a single logarithmic expression using the properties of logarithms (you may assume that z is positive): $\log_4(z) + \log_{16}(z+1)$.

6. (8 points) Find the domain of the function $f(x) = \sqrt{x^2 - 3x - 4}$

7. (8 points) Solve and check your answer for the following rational equation: $\dfrac{5}{3x+2} = \dfrac{2}{x-1}$

8. (8 points) Solve the rational inequality: $\dfrac{2x-6}{x+1} > 0$. Be sure to justify your anwer using appropriate methods.

9. (6 points) The supply function for a certain product is given by $p = 30 \cdot (4^q)$, where p is the price of the product and q is the quantity supplied at that price. If the price of the product is \$30,720, how many units will be supplied?

10. (a) (6 points) Find $f^{-1}(x)$ when $f(x) = -3x + 5$.

(b) (6 points) Find $g^{-1}(x)$ when $g(x) = \log_5(x - 3)$.

11. (6 points) Suppose $R(t) = 2t$ is a function that gives the radius of a circular oil spill at t minutes. Given $A(r) = \pi r^2$, find an expression for $A(R(t))$, and leave your final answer in terms of π.

12. (8 points) Given $f(x) = 2x^2 + x - 4$ and $g(x) = 3x + 2$, find $f(g(x))$ and write your answer in the form $ax^2 + bx + c$.

13. (12 points) Graph $f(x) = 2^x$ and $g(x) = \log_2(x)$ on the same grid. Include at least 4 points on each graph and include relevant asymptotes.