Name:
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Final Exam – Summer 2017

Directions: You will find 11 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. (7 points) Find the equation of the line connecting the two points $(-4, 7)$ and $(5, 12)$.

2. (8 points) Suppose the cost function for a certain product is given by $C(x) = 16x + 3900$ and the revenue function for the product is given by $R(x) = 45x$. Find a formula for the following functions:

   (a) Profit Function, $P(x)$

   (b) Average Cost Function, $\overline{C(x)}$

3. (8 points) Given $g(x) = x^2 - 4x$ and $h(x) = 7x + 9$, find the following:

   (a) $(hg)(x)$

   (b) $h(g(x))$

4. (10 points) The cost function $C(x) = 2x^2 - 800x + 102000$ describes the cost, in dollars, of making x units of a certain product. What is the vertex of this quadratic function? Show your work with algebra. If you choose to use a graph as part of your work, you must include a graph having the pertinent information that helps to answer this question.

5. (8 points) Solve and check: $x - 4 = \sqrt{4x - 20}$

6. (8 points) Find a rational function with the following features: (a) horizontal asymptote at $y = 0$; (b) poles at $x = 4$ and $x = -2$; (c) zeros at $x = 1$ and $x = -1$.

7. (9 points) Fill in the blank:

(a) $\log_3\left(\frac{1}{81}\right) =$ _____

(b) $\log_2(64) =$ _____

(c) $\log_b(b^2) =$ _____

8. (8 points) Suppose \$200 is invested in an account paying 1.5% annual interest, compounded continuously. Using an exponential growth model, $P(t) = P_0 e^{kt}$, determine the time required for the initial investment to double.

9. (8 points) Solve for x the equation: $2e^{x+2} - 3 = 11$. Leave exact (don't use a calculator).

10. (8 points) Solve the following system using any method except the calculator method:

$$4x - 3y = 8$$
$$5x + 2y = 1$$

11. (8 points) JUST SET UP a system that would help solve the following problem. DO NOT SOLVE IT. Light roast coffee beans cost \$4.00/lb, medium roast coffee beans costs \$1.00/lb, and dark roast coffee beans cost \$4.50/lb. If there is twice as much medium roast as there is of the light roast, how much of each type of coffee is needed to create 5 pounds of a mixture that costs \$3.50 per pound? Be sure to indicate the meaning of any variables used in setting up this problem.