Name:
Recitation Instructor:
Recitation Day and Time:

Studio College Algebra – Exam 3 – April 2019

Directions: You will find 16 problems listed below. Each problem is worth 5 points. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed (in particular, calculators with a built in CAS and/or QWERTY keyboard are not allowed). You have one hour to complete this exam. SHOW ALL WORK!

1. Rewrite the formula by taking the natural logarithm of both sides, and then use properties of logarithms wherever applicable: $y = \dfrac{7}{x^3}$ (you may assume $x > 0$.)

2. Rewrite the formula by taking the natural logarithm of both sides, and then use properties of logarithms wherever applicable: $y = (2.1)7^x$.

3. If $\log(a) = 9$ and $\log(b) = 4$, find $\log(a^2 b)$.

4. Approximately what lump sum would need to be invested at an annual interest rate of 1%, under continuous compounding, for 3 years, in order to end up with $5000? Round answer to the nearest cent. The formula you want to use is $P(t) = P_0 e^{rt}$.

5. Solve $3^{(x+3)} = 7$. Leave answer exact, i.e., do not use calculator.

6. Solve $5\ln(x+1) - 2 = 8$. Leave answer exact, i.e., do not use calculator.
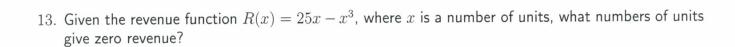
7. Given $f(x) = 2x + 7$, find $f^{-1}(x)$.

8. Find the domain of $f(x) = \log(3x - 8)$.

9. The function $P(t) = 21.109 - 5.686 \ln(t + 1)$ describes the revenue, in thousands of dollars, for the sale of a product t weeks after an ad campaign for the product ended, where $0 \le t \le 10$. Find $P(4)$, round to the nearest cent, and interpret the meaning of $P(4)$ in a complete sentence.

10. What are all the real and complex zeros of $x^3 - 64$, given that one zero is $x = 4$?

11. What is the horizontal asymptote of $f(x) = 2^x - 3$? State your equation in the correct format.

12. Find a fourth degree polynomial having single roots at $x = 5$ and $x = 3$, and a double root at $x = -1$. Do not multiply your answer out.

13. Given the revenue function $R(x) = 25x - x^3$, where x is a number of units, what numbers of units give zero revenue?

14. Given that $x = 1$ is one zero of $p(x) = x^3 - 7x + 6$, find all the other zeros of $p(x)$.

15. Is $x + 1$ a linear factor of $p(x) = x^3 + x^2 + 2x + 1$? Why or why not? Show your work.

16. Graph $f(x) = 2^x$ AND graph its inverse, $f^{-1}(x)$, on the same grid below. Label the graphs, include at least 4 points on each graph, and include relevant asymptotes.