Name:
Recitation Instructor:
Recitation Day and Time:

Studio College Algebra – Exam 3 - Fall 2021

Directions: You will find 15 problems listed below. Almost every 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: $y = \dfrac{11}{x^5}$ (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: $y = (1.9)5^x$.

3. If $\log(a) = 9$ and $\log(b) = 7$, find $\log(ab^2)$.

4. Approximately what lump sum would need to be invested at an annual interest rate of 1%, under continuous compounding, for 4 years, in order to end up with \$6000? Round answer to the nearest cent. The formula you want to use is $P(t) = P_0 e^{rt}$.

5. Solve $2^{(x+1)} = 11$. Leave answer exact, i.e., do not use calculator.

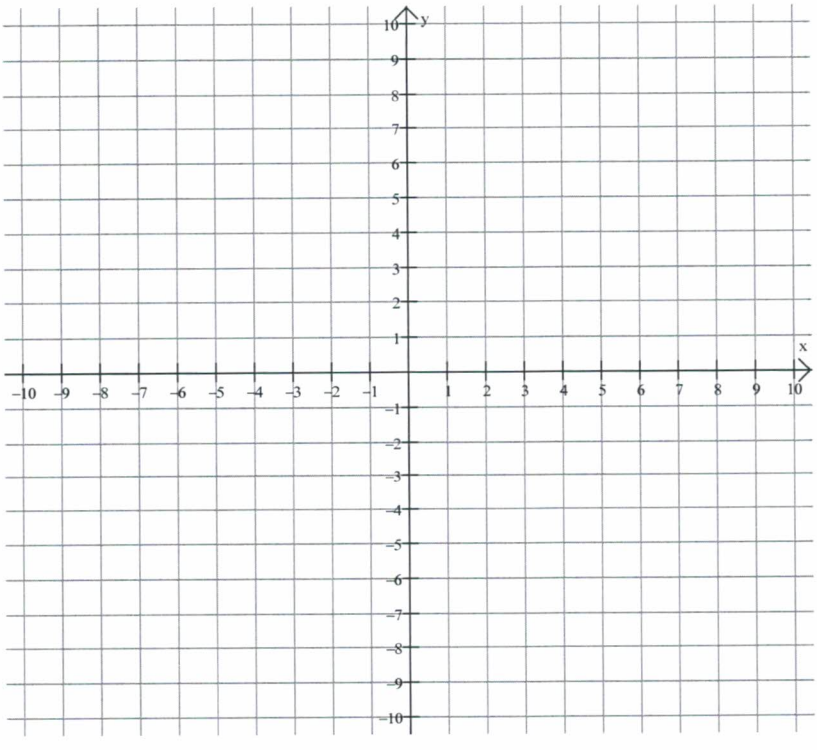
6. Solve $5\ln(x+5) - 12 = 8$. Leave answer exact, i.e., do not use calculator.

7. Given $f(x) = 11 - 3x$, find $f^{-1}(x)$.

8. Find the domain of $f(x) = \log(9 - 2x)$.

9. What is the horizontal asymptote of $f(x) = e^x + 4$? State your equation in the correct format.

10. Graph $f(x) = x^3$ 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.

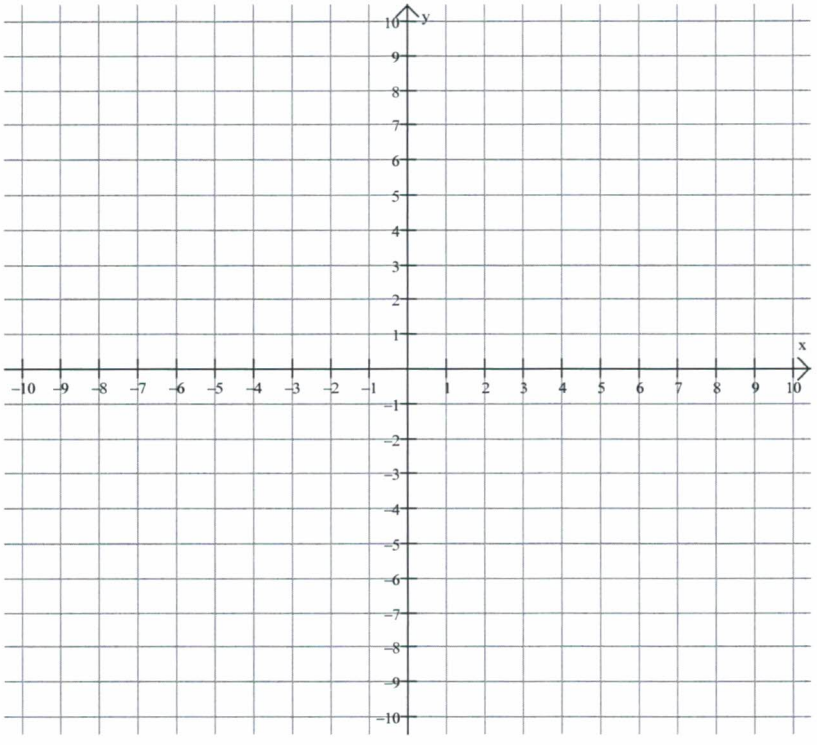


11. State the degree, leading coefficient, constant term, and leading term of $p(x) = -x^3 - 7x^2 + 6x - 2$ (you should have 4 items listed in your answer.)

12. Explain the end behavior of $f(x) = 25x - x^3$, and make sure you include reasons in your explanation.

13. Are even degree polynomials one-to-one functions? Explain as best you can using complete sentences.

14. (10 Points) 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.



15. 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 $0 \leq t \leq 10$. Find $P(5)$, round to the nearest cent, and interpret the meaning of $P(5)$ in a complete sentence.