

Name (print): _____ Signature: _____

You have 30 minutes. Show your work. Notes not allowed! Problems are on both sides of this sheet.

Problem 1. (6 pts) Do the following algebra:

a. Simplify $\ln \left[(3e^7) \right]^{11}$.

b. Evaluate $\sin \left(2^{10} \ln(1) \right)$.

c. Evaluate $10^{2 \log_{10} 6}$.

Problem 2. (5 pts) A line goes through points $(-1, 3)$ and $(2, 1)$. Where does it intersect the x -axis?

Problem 3. (5 pts) A population of animals oscillates sinusoidally between a low of 700 on January 1st and a high of 900 on July 1st.

a. Sketch a graph of the population as a function of time (measured in months since the start of the year).

b. Find a formula for the population as a function of time.

Problem 4. (4 pts) If the domain of $f : \mathbb{R} \rightarrow \mathbb{R}$ is $\{x \in \mathbb{R} \mid x \neq 10\}$ and $g(x) = x^2 - 4x - 2$, find the domain of $f(g(x))$.