

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) Consider the function $7 - 4\sin(13x)$.

a. What is its range?

b. What is its period?

Problem 2. (5 pts) For the functions $f(x) = 3\sin(x^2)$ and $g(x) = 5e^x$, find the following:

a. $g(f(0)) =$

b. $f(g(x)) =$

c. $\ln(2g(x)) - x =$ *Simplify the answer to c.!*

Problem 3. (5 pts) The half-life of a certain radioactive substance is 12 hours. There are 8 grams present initially.

a. Express the amount of substance remaining as a function of time t .

b. When will there be 1 gram remaining?

Problem 4. (4 pts) If the domain of $f : \mathbb{R} \rightarrow \mathbb{R}$ is $[0, \infty)$ and $g(x) = x^2 + x - 6$, find the domain of $f(g(x))$.