Problem 1. *Approximate the following using linear approximation. Make sure to state your function and base point.*

(a) $\cos(2)$

(b) $\sinh(\sin(0.001))$

(c) $(.99)^3 - 4.95^2$

Problem 2. *You deposit* $\$1,000$ *in the bank, at an interest rate of* 2%*, compounded continuously. Let* $M(t)$ *be the amount of money you have in the bank (in dollars), at time* t *(in years).*

(a) What is $M(0)$*?*

(b) What does the phrase "an interest rate of 2%*, compounded continuously" actually mean? Your answer should be a differential equation involving the derivative of* M*, the function* M*, and the number* 1.02*.*

(c) Solve for $M(t)$*.*

(d) How much money will you have after one year? Two years? Ten years?

(e) Consider the following offer: I'll hold your $\$1,000$ *for 10 years, giving you a flat* $\$50$*/year, and then return the* $\$1,000$ *after the 10 years. Is that a better deal than the bank is offering? What if I only hold it for a year?*