ACMAT118 Spring 2024
Professor Manguba-Glover
Section 5.6 Classwork (CW 4) Name: _____

Complete as many of the following problems as you can with your table. You do not have to go in order. If **your entire table** finishes early, and your answers have been checked, you may leave early.

1. Solve for x:

   (a) $\log_3(2x-1) = -1$

   (b) $\ln(x+1) = 2 + \ln(x-1)$

   (c) $\log_5(x+12) + \log_5(x-12) = 2$

   (d) $\log(x+1) = 2\log(x-1)$

2. Solve for x:

   (a) $3^{3x} = 3^{1-2x}$

   (b) $3(4)^{x-2} + 2 = 83$

   (c) $e^{2x+3} = 10$

   (d) $5^{x-1} = 2^{x+1}$

3. The half-life of plutonium-241 is 13 years. Initially a sample has 2 grams.
   (a) How many grams will remain after 5 years?
   (b) How long will it take for 90% of the sample to decay? (Note: 90% of x is $0.9x$)

4. Suppose that 1000 dollars are deposited in a savings account paying 9% interest compounded continuously. How long will it take for the account to have $3000.

Key:

1. (a) $\frac{2}{3}$
   (b) $\frac{e^2+1}{e^2-1}$
   (c) 13
   (d) 3

2. (a) $\frac{1}{5}$
   (b) $\log_4 27 + 2$
   (c) $\frac{-3+\ln(10)}{2}$
   (d) $\frac{\ln(10)}{\ln(5/2)}$

3. (a) $2e^{\frac{5}{13}\ln(1/2)}$ grams
   (b) $\frac{13\ln(1/10)}{\ln(1/2)}$ years

4. 12.2 years.