MATH 211: 9-22 WORKSHEET

(1) Observation suggests that a colony of bacteria is growing at a rate proportional to its current size. Let B denote the population of the bacteria after t days. If the initial population is $10,000$ and the population exactly 48 hours later is $16,000$, determine a formula to model the population B as a function of time t. Use this formula to predict how large the population will be after 7 days.

(2) Use the formula from the previous problem to predict the bacteria population after 30 days. Then use it to predict the population after a full year. Do you think this model is accurate at these time scales? Why or why not?

(3) Plutonium-238 has a half-life of 87.7 years. A scientist at Los Alamos National Lab is using a 143.4 gram bar of plutonium-238 in her experiment. If the bar was originally minted 60 years ago, what was its mass at time of mint?