MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

GROWTH AND DECAY **Math 1001 Worksheet** FALL 2019

For practice only. Not to be submitted.

1. The half-life of Einsteinium-254 is 270 days. A sample initially has a mass of 3 mg.
   (a) How much is left in the sample after 30 days?
   (b) After how many days will the sample be reduced to 0.5 mg?

2. A group of "castaways" arrives on a deserted island for a reality game show. While there, they learn that a number of parakeets were relocated to the island 2 years before; this population now numbers roughly 50 birds. Three years later, some of the "castaways" return to the island for an "all-star" edition of the show. They discover that there are now about 150 parakeets. If the population has been growing exponentially, how many parakeets were there originally?

3. A flu virus passes through the people living in a city at an exponential rate. If 10% of the population is infected after 10 days, how long will it take for 40% of the people to contract the flu?

4. Foul play befalls a math professor who failed one too many students. The police discover his body (which has cooled from 37°C to 25°C) half an hour after his demise, on a MUN parking lot where the temperature is −8°C. The medical examiner arrives on the scene 15 minutes after the police. What is the temperature of the math prof's body at this time? Use Newton's Law of Cooling.