# Post-Lecture #5: Statistics of Radioactive Decay I

1. Flourine-18 has a half-life of about 110 minutes; solve for the time at which the sample has decayed to 0.1% of its original value.(Hint: $\ln e^{-\lambda t} = -\lambda t$)

2. Describe the difference between half-life and mean-life (aka average-life). Provide your answer in full sentences. Then, walk me through a scenario that depicts the difference.

3. You receive a shipment of a very important radioisotope. While filling out paperwork to receive the shipment, you realize that somebody (likely you) forgot to record the original activity! You assay the sample in a well-chamber at 4 PM (16:00) and find that the activity is 200 mCi; given that it has a half-life of 13.74 hours, what was the activity at 9 AM (09:00)? Furthermore, this sample will be used for a patient scheduled for 6 PM (18:00); what will the activity be then? Please provide enough steps so that I can trace any errors that may occur.