

MHF 4UI – Prob Set # 25 – *Exponential Growth and Decay Problems*

1. The population of a city is 810 000. If it is increasing by 4% per year, estimate the population in four years.
2. A painting, purchased for \$10 000 in 1990, increased in value by 8% per year. Find the value of the painting in 2000.
3. A river is stocked with 5000 salmon. The population increases by 7% per year.
 - a) What will be the population in 15 years ?
 - b) How many years will it take for the population to double ?
4. A house was bought 6 years ago for \$175 00. If real estate values have been increasing at 4% per year, what is the value of the house now ?
5. A used car dealer sells a 5-year old car for \$4200. What was the original value of the car if the depreciation is 15% a year ?
6. To determine whether a pancreas is functioning normally, a tracer dye is injected. A normally functioning pancreas secretes 4% of the dye each minute. A doctor injects 0.50 g of the dye. Twenty minutes later, 0.35 g remain. If the pancreas were functioning normally, how much dye should remain ?
7. If inflation is roughly 2% per year:
 - a) When will a \$12 movie ticket cost \$15 ?
 - b) How long ago did a movie ticket cost \$4.25 ?
8. An element is decaying at the rate of %12/hr. If you initially have 100 g:
 - a) How much will remain after 10 hrs ?
 - b) When will there be 40 g left ?
9. A research assistant made 160 mg of radioactive sodium and found that there was only 20 mg left 45 hrs later.
 - a) What is the half-life of the sodium ?
 - b) Find a function that models the amount A left after t hours.
 - c) How much of the original 20 mg is left after 12 hours ?
 - d) If the lab requires 100 mg of sodium 12 hours from now how much should be made now ?
10. A man claims a piece of wood is from the stable where Christ was born 2000 years ago. The museum tests the wood and finds it contains 4.2×10^{10} atoms of carbon per gram. Carbon from present day wood contains 5×10^{10} atoms of carbon per gram. If the half life of carbon is 5760 years determine if the wood is authentic or not.