

Mathematics 172 Homework

- A population size, $P(t)$, of fish in a pond grows where t is the number of years since the population was introduced to the pond. If the number of fish introduced is 45, and after 4 years there are 120,
 - Find a formula for $P(t)$. *Answer:* $P(t) = 45(1.278)^t$.
 - What is the population size after 10 years? *Answer:* $P(10) = 523.0$
 - When does the population size reach 5,000? *Answer:* $t = 19.20$ years.
- A radioactive material decays with a half life of 13.4 years.
 - If we start with a an amount A_0 of the substance, then give a formula how much is left after t years. *Answer:* $A(t) = A_0(.9496)^t$.
 - How long before there is only 10% of the original ammount left. *Answer:* 44.43 years.
- The half life of uranium-235 is 703,800,000 years.
 - Starting with a pure sample of uranium-235 of A_0 grams, give a formula for how much is left after t years. *Answer:* $A(t) = A_0(.5)^{t/730,800,000}$.
 - Explain why I wrote the answer of (a) in the form I did rather than computing

$$A(t) = A_0 \left((.5)^{1/730,800,000} \right)^t$$

and using the calculator to compute $(.5)^{1/730,800,000}$.

- Rocks collected in the Transvaal, South Africa have 7% of their original uranium-235 left. How old are they? *Answer:* 2,700,000,000 years.