

Logarithms Word Problems

- 1) Find how long it will take, to the nearest month, for \$ 12 500 to grow to \$ 20 000, if it is invested at 10% compounded monthly.

- 2) How long will it take 20mg of iodine-131 to decay to 16.85mg if the half-life of iodine-131 is 8.1 days?

- 3) The caribou population of an area has been growing at an annual rate of 2%.
 - a) If there are 850 caribou now, how long will it take before there are 1000?

 - b) How long will it take for the population to double?

- 4) At the initial count there were 280 bacteria in a culture. Ten hours later, there were 4480 bacteria. What is the doubling period for this type of bacteria?

- 5) In 15 days, a sample of bismuth-210 has decayed to $\frac{1}{8}$ of its original mass. What is the half-life of bismuth-210?

- 6) Iodine-131 has a half-life of 8 days. How long will it take for a 100mg sample to decay to 12.5mg?

7) Richter scale Consider the table of some earthquakes in the twentieth century.

Location and Date	Magnitude
Japan 1933	8.9
Alaska 1964	8.5
Guatemala 1976	7.5

- a) How many times as intense was the earthquake in Japan as the one in Alaska?
 - b) How many times as intense was the earthquake in Japan as the one in Guatemala?
 - c) How many times intense was the earthquake in Alaska as the one in Guatemala?
 - d) If the recent earthquake in the Pacific Ocean was half as intense as the one in Guatemala, then what was its approximate magnitude? Hint: Use trial and error with the exponent key.
- 8) Chemistry A logarithmic scale, in base 10, is used to express the pH of solutions. This scale measures relative acidity, compared with neutral water which has a pH of 7. A pH of less than 7 indicates an acidic solution, while a pH of more than 7 indicates a basic solution.
- a) Acid rain has a pH of 4.2. How many times as acidic is acid rain as neutral water?
 - b) Tomato juice has a pH of 4.1. The pH of eggs is 7.8. How many times as acidic is tomato juice as eggs?