MATH 120R - LAB 4

Pre-Lab component

Each member of your group is responsible for answering these questions. This component will count for 10 points towards your grade on lab4.

In the following problems, cite references for each of your answers. Give as complete answers as you can, yet make each answer understandable to the average citizen. (Pretend that you are reporting on an evening news program.)

1. What are some of the harmful effects of radon?
2. What is the Federal maximum acceptable level of radon in a residential house?
3. What can a homeowner do to alleviate the harmful effects of radon?
4. What is the price range of radon detection kits (names and model numbers) and how do they work?

Radon Lab

In the past decade, alarm has spread over several parts of our country concerning radon, a highly radioactive gas, which can have severe deleterious effects on people who remain in contact with it for prolonged periods. This gas, which is formed by the disintegration of radium, is found in the soil over most of the earth. It can seep through foundations of homes and office buildings and since it is colorless and odorless, detection by the natural senses is impossible. Radon detection kits are available at most hardware stores. The chief use of radon is in the treatment of cancer by radiotherapy. F.O. Dorn discovered one of the most common forms of radon, radon 222, in 1900. He called it radium emanation. We shall investigate this form of radon.

Suppose radon is detected at a local elementary school on Monday, October 5 at 9 a.m. Students and personnel are immediately moved to a different location, and steps are taken immediately so that no additional radon contaminates the area.

Let t be the time (in days) after October 5 at 9 a.m. and let Q be the amount of radon present at the school at time t. The following table shows the amount of radon present at various times.

t	1.2	2.6	3.1	4.1	8.5
Q	40.15	31.15	28.44	23.71	10.64

Write a formula for the function that best models the data. Justify your choice.

Make a graph of the data and your formula from October 5 to October 25. Label both axes clearly.

Does your model have a maximum or minimum value on the interval on which it is graphed? Explain.

By what percentage does the radon decrease each day? How much radon is detectable at 9 a.m. on October 6?

Radon levels of less than one unit are considered safe. How many days will it take for this site to be considered safe?

Will the amount of radon on this site theoretically ever reach zero? Practically? Explain.

Suppose that the most sensitive current technology can only measure levels of .01 units of radon in a given area. In how many days will the radon on this site be undetectable (nearest day and hour)?

A reporter covering this story for a local TV show notices the ordered pair (15.7, 2.9) in your list of data and asks what it means.

Suppose that an inspector measures the radon level to be 16 units. What is the date and time (nearest hour)?

What is the half-life of radon?