Math 120 **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. You must do the computations algebraically and explain why the function used is appropriate.

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 four units 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?