MA 182 Applications of Differential Equations
Section 7.4

1. I-131 is a medically important radio isotope of iodine. I-131 has an 8-day half-life; that is, after an 8-day period, one half of a sample's radioactivity will remain. How long will it take a sample of I-131 to lose 95% of its radioactivity?

2. ***Newton's Law of Heating and Cooling***
Newton proposed that the temperature of a hot object decreases at a rate proportional to the difference between its temperature and the temperature of its surroundings. Similarly, a cold object heats up at a rate proportional to the difference between its temperature and the temperature of its surroundings. Use this property to solve the following problem.

When a murder is committed, the body, originally at 37^0 C, cools according to Newton's Law of Cooling. Suppose that after two hours, the temperature is 35^0 C, and that the temperature of the surrounding air is 20^0 C.

(a) Let y be the temperature of the body at time t, the time in hours since the murder was committed. Set up the differential equation that models this situation.

(b) Solve the differential equation in part (a) to find the temperature, y, as a function of t.

(c) If the body was found at 4 pm at a temperature of 30^0 C, at what time was the murder committed?