

Individual Homework #2: Due September 14, 2016

Please read Sections 1.2 and 1.4, and do: exercises 4, 5, 8, 9, 18, 19, 21, 24, 27, and 28, pages 37–48; exercise 5, page 60.

IMPORTANT NOTES:

1. In completing this and *any* homework assignment, please write legibly and in complete sentences. Your homework needs to be stapled and single-sided. Failure to do so **will** affect your grade!!
2. Where asked to sketch or provide graphs, *please use MATLAB!!* You should have a pretty good idea of how to do this, based on the various tutorials. And please remember to **use appropriate scales and label your axes**. But please note that you do NOT need to print out in color (though you can if you'd like).
3. Exercise 5, page 60 refers to “exercise 25 of section 2;” what they MEAN is “exercise 27 of section 1.2.”

Also, for this exercise, you are expected to use the usual “Euler’s method” procedure we have been discussing in class. That is,

$$R(10) = R(0) + \Delta R = R(0) + R'(0)\Delta t,$$

$$R(20) = R(10) + \Delta R = R(10) + R'(10)\Delta t,$$

and so on.

4. Hint for exercise 27, page 48: Remember that “is proportional to” means “is equal to a constant times.” So you want an equation that says the rate R' equals a constant times R . Your equation should give a specific value for this constant, using information given in the problem. Make sure you give your constant the right sign (positive or negative) to account for the fact that the radium is decaying.
5. Exercise 28, page 48 is similar to the previous exercise (discussed just above) except that, instead of R' being proportional to R , you now have C' proportional to $C - 70$ (the difference between the temperature of the coffee and room temperature). Also, in exercise 27 you know, from the beginning, what the constant of proportionality is. In this exercise, you won't know what this constant is at first (part (a) of this exercise tells you just to call it k), but you'll be able to find it (in part (b) of this exercise) by plugging in some additional information concerning C' and C . Once you know k , you can complete the rest of the exercise.