

Math 134, Fall 2014, Homework 10

The problems are from Calculus, One and Several Variables, 10th Edition by Salas, Hille and Etgen.

For practice - do not hand in

Section 7.6, Problems 7, 9, 21, 23, 29.

Section 9.1, Problems 3, 19, 25, 35, 43.

Section 9.2, Problems 21, 25, 27.

Section 10.1, Problems 8, 14, 25, 29, 32, 55.

Section 10.5, Problems 3, 5, 11 (sketch them for $0 \leq t \leq 2$), 24, 27, 43.

Section 10.6, Problems 8, 15, 25, 31-35, 39.

Section 10.7, Problems 3, 9, 23, 51(a).

Section 10.8, Problems 7, 15, 21, 31, Problem 1 of Project 10.8.

To hand in

Section 10.1, Problems 28, 63.

Section 10.5, Problem 3 in Project 10.5.

Section 10.6, Problem 36 (use the Chain Rule like we did in class to compute $\frac{dy}{dx}$).

Section 10.7, Problems 27, 43.

Section 10.8, Problems 27 and Problem 2 of Project 10.8.

Also, do you take your coffee with cream?

Experimenting, I have found that 12 ounces of 180° F coffee in my favorite cup will take 20 minutes to cool to a drinking temperature of 110° F in a 70° F room. Assume that when I add cream to the coffee, the two liquids are mixed instantly, and the temperature of the mixture instantly becomes the weighted average of the temperature of the coffee and of the cream (weighted by the number of ounces of each fluid). Also assume that the cooling constant of the liquid (the k in the DE) does not change when I add the cream.

I take my coffee with cream. I am going to add 2 ounces of cream at 40° F to my coffee. In order to reach drinking temperature as quickly as possible, should I

1. Add the cream immediately to my 12 ounces of 180° F coffee and wait for it to cool down to 110° F?
2. Wait 5 minutes before adding the cream?