

Thursday, October 24

Follow the separate general guidelines for Parts A,B,C. Be sure to include and label *all four* standard parts (a), (b), (c), (d) of Part A in what you hand in.

Fitting polynomial functions to data

Section 3.3.2

A: Reading questions. Due by 3pm, Wed., 30 Oct.

1. How can you detect whether a function can be well described by a polynomial function of degree n ? Illustrate with an example.
2. Consider the exponential function $f(x) = 3^x$. What happens if we apply the method of finite differences to this function to try to describe it by a polynomial function?
3. The unnumbered example on p. 123 fits a polynomial to the four points

$$(-1, 3), (0, -1), (1, 2), (2, -2),$$

using a system of linear equations. Analyze this data, instead, with the method of finite differences. What are the strengths and weaknesses of each method (linear equations vs. method of finite differences) on this example?

B: Warmup exercises. For you to present in class. Due by the end of class Thu., 31 Oct.

3.3.2 Problems: 1

An extended analysis of the box problem

Section 3.3.3

A: Reading questions. Due by 3pm, Mon., 4 Nov.

1. Graph equation (1), pointing out any interesting features of the graph, including those features that are interesting for the box problem. (“Interesting” is a subjective word here, I suppose. Use your best teacher judgement.)
2. Solve the box problem for a 13” by 21” sheet of paper.
3. Why can we set the width W of the rectangle equal to 1 in the first paragraph of the subsection “Generalizing the problem” (on p. 126)? What happens if we leave the width as W ?
4. Explain more carefully the statement following equation (4) (on p. 127) that “Since (2) shows that $V(x, L)$ is a cubic function of x with positive leading coefficient, the local maximum of V will be at the smaller of these two values of x , so it is the negative sign of the \pm that we want in (4).”
5. This is the last part A assignment of the semester. Take several minutes to reflect on how these assignments have (or have not) changed how you read and study mathematics in this or other courses. Are you doing anything now that you didn’t do at the beginning of the semester? Do you plan to do anything different in the future? Your answer does not need to be more than a paragraph, but it can be if you want it to be.

B: Warmup exercises. For you to present in class. Due by end of class Thu., 7 Nov.

3.3.3 Problems: 1, 2, 3