

MATH 104/184: Weeks 11 and 12 Learning Goals
August 16, 2012

Learning Goals

Over the last two weeks of term, we will cover Approximation (Linear, Quadratic and the more general Taylor Polynomial), and finish with a discussion on inverse trigonometric functions. The Linear Approximation Material is in Section 4.5, and you may have already covered some of this last week. The Taylor Polynomial material will be from Section 9.1 of Briggs Cochran. The inverse trigonometric functions are covered in section 3.9 of Briggs Cochran. You should have covered the basics of inverse trigonometric functions in Math 12, and the main content of 3.9 for you will be the derivatives of $\arcsin x$, $\arccos x$, and $\arctan x$.

Suggested problems that help build these skills are given as [section: question #s].

The specific learning goals for this week for Linear Approximation are that by the end of week 12 and review homework, you should be able to:

1. use linear approximations to estimate the values of functions near a given $x = a$; [4.5: 9, 10, 12, 16, 18, 22, 39, 43, 45, 47]
2. use linear approximation to approximate changes in the dependent variable given changes in the independent variable; [4.5:25, 26]
3. given the exact value, discuss the discrepancy with the linear approximation in terms of the second derivative (for example, whether it is an underestimate or overestimate); [4.5: Quick Check 1, 43]
4. analyze the worst-case error for a linear approximation of a function using a formula based on the second derivative of the function;
5. use the quadratic approximation to estimate the values of functions; [9.1: 7,9]
6. explain the difference between the 2nd order term in quadratic approximation and the worst-case error term for linear approximation;
7. find the n th degree Taylor polynomial of a given function with a given centre $x = a$; [9.1: 15,19,27,65]
8. use a Taylor polynomial to approximate the values of functions; and [9.1: 33,36,37]
9. use the table of derivatives of inverse trigonometric functions in calculations of derivatives. [3.9: 7 – 12, 20,24]

Suggested Problems

Suggested Problems: This week, all suggested problems from the text are:

Chapter 4.5: Quick Checks 1 – 4; Exercises 2, 3, 4, 9, 10, 12, 16, 18, 22, 25, 26, 35, 39, 43, 45, 47.

Chapter 9.1: 1,2, 6, 7, 9, 15, 19, 27, 33, 36, 37, 65.

Chapter 3.9: 7 – 12, 20, 24.

(* means the problem is hard or is a proof-type question)

Webwork Homework: You will be asked to do wwAssignment10 based on this material. It will be due on the last day of classes (Dec. 2nd).