

**LB 118, Sections 003 & 004, Spring 2016**  
**Homework 6 (due 02/22)**

**Instructions:** Please review the section of the course syllabus on homework before writing up your solutions to the problems below. Do not write on or turn in this document. Instead, write your solutions on looseleaf or blank paper. Homework is due at the start of class.

Please read through sections 3.1–3.4 of the textbook and carefully work through each of the Explore exercises before attempting the problems below. Section 3.2 is very challenging to read; make an honest attempt to read it, and then post a question on Piazza.

1. Solve Exercise 3.2.5 parts b, c, g, h. Solve parts b, c, g, and h using algebra when needed or write a sentence to explain your reasoning if no algebra is needed to determine the limit.
2. Solve Exercise 3.2.5 part i in three different ways:
  - (a) Use numerical methods to estimate the limit. To do this, modify the R code shown on the Tutorial Worksheet from 02/15/2016. When you write your solution, write out the exact R code you typed into RStudio and list the output. Then write a sentence stating your estimate for the limit.
  - (b) Use graphical methods to estimate the limit. To do this, graph the function  $f(x) = (x^4 - 1)/(x - 1)$ . You can do this by hand if you like, but use RStudio (preferred), Wolfram Alpha, or your calculator to check your work. You will earn one bonus point if you print out a graph that you made using RStudio. The axes should be properly labeled. Please refer to the R & RStudio Introduction. The latest version is posted on our course web page. Here is a link:  
[http://www.math.msu.edu/~robertbe/lb118ss16/r\\_rstudio\\_notes.pdf](http://www.math.msu.edu/~robertbe/lb118ss16/r_rstudio_notes.pdf)
  - (c) Use algebraic methods to compute the limit. (Hint: To factor  $x^4 - 1$ , look at how we factored  $b^3 - a^3$ . The pattern is similar.)
3. Solve Exercise 3.2.10 parts b, d, g, and k. You must use algebraic methods to solve these exercises. Show all of the steps you take to compute the limit.

- Solve Exercise 3.3. parts g, l, m, and r. You must use algebraic methods to solve these exercises. Show all of the steps you take to compute the limit.

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**Self-study Problems.** The following exercises are for self-study. Please do not turn in solutions to these exercises. On the other hand, please do ask how to solve these problems on our Piazza discussion forum if you find some which you are not certain how to solve or one for which you are not certain you've found the correct answer.

Chapter 2 Exercises: 2.1.1, 2.2.1–2.2.5, 2.3.1–2.2.4, 2.3.6, 2.3.7, 2.6.1, 2.6.3–2.6.5, 2.6.8, 2.6.13, 2.7.5, 2.7.6, 2.7.9, 2.7.13, 2.8.1, 2.8.2, 2.8.4, 2.8.7, 2.8.8, and 2.8.11.

Chapter 3 Exercises: 3.1.1, 3.1.5–3.1.7, 3.1.11–3.1.14, 3.2.1 (a,b), 3.2.5, 3.2.6, 3.2.10, 2.2.11, 3.3.1–3.3.5, 3.3.7 (use R to plot the function), 3.3.8, 3.3.9, 3.4.1–3.4.3. Additional problems will be added to this list as we work through Chapter 3.