Math 4303 **FUNDAMENTALS OF MATH** Fall 2012
Dr. Duval **Homework**
Thursday, October 18

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 linear and exponential functions to data

Section 3.3.1

A: Reading questions. Due by 3pm, Wed., 24 Oct.

1. Right after Table 4, the text claims that one of the functions $f(x), g(x), h(x)$ can be well described by an exponential function, one that can be described by a polynomial function, and one that cannot be well described by either. Which is exponential, and how can you tell? Show that the other two are not linear. [Note: Even though this is the first reading question, you may have to do it last. But think about it as you read this section, and the next.]
2. Make another example like Example 1, including showing how someone else could deduce it is well modeled by a linear function.
3. Show carefully that your example in the previous question satisfies Theorem 3.15.
4. Explain in your own words the difference between **rate of change** and **growth rate**.
5. How can you detect whether a function can be well described by an exponential function? Illustrate with an example.

B: Warmup exercises. For you to present in class. Due by end of class Thu., 25 Oct.

3.3.1 Problems: 4, 6, 7

Fitting polynomial functions to data

Section 3.3.2

A: Reading questions. Due by 3pm, Mon., 29 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 Tue., 30 Oct.

3.3.2 Problems: 1