Midterm Key

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To enter text, just type away! LaTex will arrange everything for you. It automatically indents each paragraph. Two carriage returns result in a new paragraph.

You need to be aware of several special symbols. Commands begin with the \ symbol. Some of the basic ones follow. The % symbol labels the LaTex line as a comment. Nothing appears in the output. A pair \\ results in a carriage return. Math symbols must appear in one of two environments. If you wish an exptression to appear in the same line with text, then enclose it within matching $. Try $f(x) = e^x$. LaTex automatically controls spacing. The other environment is called display math. The math object is enclosed within \[and \]. In addition to being the prettiest typesetting, the math object is centered with ample spacing before and after. Try

$$f(x) = e^x$$

. Many choices for math symbols appear at the left in TexMaker. Matching braces {} are used to group symbols, for example, into subscripts or superscripts. Now, compare the Latex files to the output files to gain an understanding of how to construct beautifully dispayed mathematics.

1 Problem 1

a. We denote a limit by

$$\lim_{\substack{x \to a \\ x \neq a}} f(x) = L$$

Given $\epsilon > 0$ there exists a $\delta > 0$ such that $|f(x) - L| < \epsilon$ whenever $|x - a| < \delta$.

In writing a portion of the proof in part (b), I show you how to make use of arrays. These are framed by begin and end statements.

b. We pick up with the proof:

$$\begin{aligned} |x^4 - a^4| = & \quad |x-a||x^3 + x^2a + xa^2 + a^3 \\ \leq & \quad |x-a|(|x^3| + |x^2a| + |xa^2| + |a^3|) \end{aligned}$$

For problem 2 we import a figure. For our purposes only the .pdf, .jpg, or .png files are allowed. I created a graph in Derive called Graph.jpg and placed it in the same directory with this LaTex file. I also add a caption. As with arrays, the environment is designated by begin and end statements.

2 Problem 2

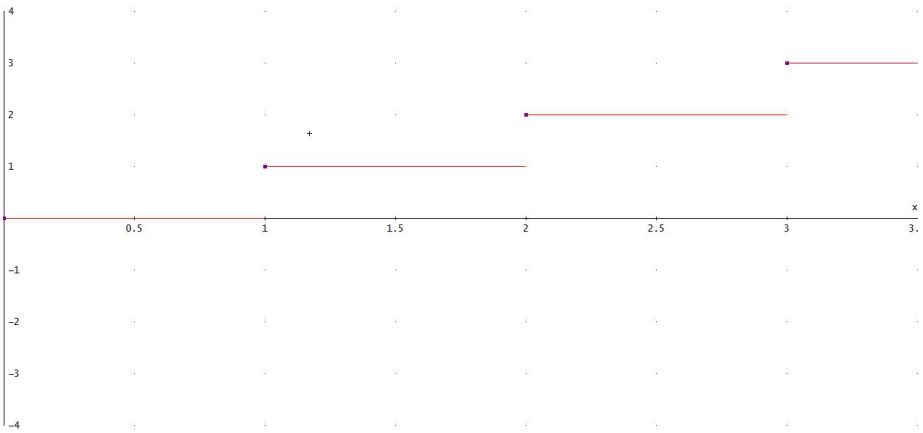

Figure 1: h(x)

We use arrays again in problem 3 to create a function in pieces. We introduce an expandable brace in display math.

3 Problem 3

$$g(x) = \begin{cases} x^2 & x \geq 0 \\ -x^2 & x < 0 \end{cases}$$