

## Some Things to Keep in Mind

- I should *never* see

$$\frac{1}{0} = \infty.$$

Strictly speaking (and that's the only way a mathematician speaks) the following are *not* defined:

1.  $\frac{1}{0}$
2.  $\frac{0}{0}$
3.  $0^0$

- Infinity is not a number, it is a concept. The answer to the question “what is the largest number” is “there is no largest number.” As such any equation that involves the symbol  $\infty$  is not valid.
- The two functions  $\frac{x}{x}$  and the function 1 are *not* the same. This is because the first function is not defined at 0 while the second one is (it is equal to 1 there).
- The use of arithmetic over the use of algebra is frowned upon. There are several reasons for this
  1. If solved algebraically, nearly all problems simplify in some way. This will be missed if the student switches to the use of numbers too early.
  2. Most students are actually better at algebra than they are at arithmetic and do not realize it. For instance, probably nobody thinks that they can multiply the numbers 69 and 71 in there head. While at the same time, everybody knows the algebraic equation

$$x^2 - 1 = (x - 1)(x + 1).$$

Thus 69 times 71 is  $70^2 - 1$  and  $70^2$  is easy to do in your head (it of course equals 4900) thus 69 times 71 is  $4900 - 1 = 4899$ .

- The *only* way to learn calculus is to *do* calculus. I will always be willing to work out any problems that have not been assigned in class with the student. Every problem that you solve adds to your ability as a student. A student rarely has the ability to learn much from going to lecture alone.
- On exams feel free to *not* simplify any arithmetic that comes about. Even the best student under pressure loses the ability to do the easiest arithmetical calculations.