

Common mistakes on reading #1

When we *define* something, we aren't just trying to describe it. We want to aim toward writing something down that tells us without exception what the thing we want to define is, and would allow the reader to construct or identify that thing correctly solely from reading the definition.

In your sets, I see often where you describe some aspect of the thing we want to define, but you don't define it completely. I also see where you tell me some nice facts about the thing we want to define, but don't actually define the thing itself.

Remarks on your definition of a function

If you said something like...

(a) "The solution to a differential equation".

— why this is not a good definition: First, it does not tell us exactly what a function is, only something it satisfies - you are describing something you think a function does, but not what it is. Also, a solution to a differential equation need NOT be a function, AND there are functions out there that are not solutions to differential equations. Careful!

(b) "a relationship or expression involving one or more variables"

— There are plenty of things that satisfy this statement that are NOT functions, for instance - $x^2 + \cos(x) = \sin(xt)$. This is an expression involving two variables, but I cannot claim that it defines a function. So, while functions do fit this description, this description is not enough to accurately define a function.

Remarks on your definition of unique solution

— Many people included the context of the reading in their definition. However, the idea of a unique solution is present in many areas of mathematics, and is not limited to the solutions of first order equations.

We say a problem has a unique solution if there is exactly one solution to the problem.