

MATH 236: Calculus II  
Exercise A  
due Wednesday, September 12

(1) What is the *definition* of continuity of a function at a point?

(2) Arguing directly from the definition of continuity, show that the function  $f(x) = \frac{1}{x}$  is continuous at any point  $c > 0$ . You may use the Algebra of Limits theorem. (That is, you are not required to argue from the definition of a limit of a function at a point, although you may.)

(3) Quote the Calculus I theorem that guarantees that

$$\int_1^x f(t)dt$$

exists for all  $x > 0$

(4) From now on, we define a function which for reasons of our own we will call  $\ln(x)$  as

$$\ln(x) = \int_1^x \frac{1}{t} dt$$

(At this point the name “ln” is arbitrary; it does not mean anything other than being a name for this function we have defined.)

(5) On the same axes, sketch the graphs of  $f(t) = \frac{1}{t}$  and  $\ln(x)$ .