Math 134: Homework 8

Due November 19

1. Let $f : (a, b) \to \mathbf{R}$ be an increasing function. Show that f^{-1} is increasing on the range of f.
   Note: *The function f is not necessarily continuous.*

2. Assume that f is continuous and one-to-one on (a, b). Show that f is either increasing or decreasing.

3. For $x > 1$ let
$$K(x) = \int_e^x \frac{dt}{\ln(t)}$$
   Show that if a and b are positive constants, then the following two equalities hold:

$$\int_e^x \frac{dt}{\ln(t+a)} = K(x+a) - K(e+a) \tag{a}$$
$$\int_e^x \frac{dt}{b+\ln(t)} = e^{-b}\left\{K(e^b x) - K(e^b e)\right\} \tag{b}$$