Homework to be done by November 12th

Section 7.1: Problems 13, 21, 25, 37, 39, 51 (Note: there is a typo in 51(b). The question should be: \textit{If \( f \) has an inverse, what conditions on \( g \) will imply that \( f^{-1} \) is differentiable?})

Section 7.2: Problems 21, 23, 24, 25.

Section 7.3: Problems 7, 8, 11, 15, 23, 27, 31, 42, 45, 47, 49, 66, 69.

Section 7.4: Problems 11, 19, 23, 27, 37, 41, 42, 56, 69.

Section 7.5: Problems 27, 28, 29, 44, 45, 49.

Problems to be handed in on November 12th

\textbf{Problem 1.} Let \( f \) be an increasing function on \((a, b)\). Show that \( f^{-1} \) is also increasing on the range of \( f \). (Note: \( f \) is not necessarily continuous.)

\textbf{Problem 2.} Assume that \( f \) is continuous and one to one on \((a, b)\). Show that \( f \) is either increasing or decreasing.

\textbf{Problem 3.} For \( x > 1 \), let
\[ K(x) = \int_c^x \frac{dt}{\log t}. \]
Show that if \( a \) and \( b \) are positive constants then the following equalities hold:

3.1 \[ \int_c^x \frac{dt}{\log(t + a)} = K(x + a) - K(e + a). \]

3.2 \[ \int_c^x \frac{dt}{b + \log t} = e^{-b} \left[ K(e^b x) - K(e^{b+1}) \right]. \]

3.3 \[ K(e^x) = \int_1^x \frac{e^t}{t} dt. \]