- Routine problems:

  §7.1. # 11, 21, 25, 39, 41.

  §7.2. # 21, 23. Then show that

$$\frac{1}{2}+\frac{1}{3}+\cdots+\frac{1}{n}\leq \ln n \leq 1+\frac{1}{2}+\cdots+\frac{1}{n-1}$$

  for all integers n, $n \geq 2$. (Problems 24 and 25 are <u>hard</u> as stated—the answer to 25 in the book is wrong!)

  §7.3. # 7, 8, 11, 15, 23, 27, 31, 38, 40, 41, 45, 62.

  §7.4. # 11, 19, 23, 27, 37, 41, 42, 71, 72.

  §7.5. # 27, 28, 29, 45, 49.

  §7.7. # 17, 20, 22, 29, 31, 35, 45, 50, 54.

  §7.8. # 5, 10, 17, 23, 37, 43, 52.

  §7.9. # 14, 19, 20, 21, 37.

  §7.6. # 13, 19, 29.

- To hand in:

  (1) Let $f:(a,b)\to\mathbb{R}$ 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:

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

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