

Math 131A, problem set 01
Completed version due: Fri Aug 29
Last revision due: Fri Sep 19

All problem numbers refer to Bartle and Sherbert.

Problems to be done but not turned in: (1.2) 2, 6, 13; (2.1) 1(a), 2(a,c), 15(a), 16, 19, 21(a), 22(a).

Problems to be turned in:

1. Use induction to prove that for any integer $n \geq 3$, $n^3 \geq n^2 + 10$.
2. Prove that $(-1)(-1) = 1$. You may use any of the axioms (A1)–(A4), (M1)–(M4), or (D), and you may also use Thm. 2.1.2 and (2.1) 1(a). Please cite each axiom or result specifically when you use it.
3. Let a and b be real numbers. In the following, you may use any of the axioms or results in Section 2.1, **up through Thm. 2.1.8 only**; please cite each axiom or result specifically when you use it.
 - (a) Prove that if $a > 0$, then $(1/a) > 0$.
 - (b) Prove that if $a > b > 0$, then $(1/b) > (1/a)$.
4. Let c be a real number. In the following, you may use any of the axioms or results in Section 2.1; please cite each axiom or result specifically when you use it.
 - (a) Prove that if $0 < c < 1$, then $0 < c^2 < c$.
 - (b) Now suppose that $c < -1$. Put $0, 1, -1, c, -c, c^2$, and $-c^2$ in correct “ $<$ ” order, and prove your answer.
5. (2.1) 10(b). You may use any of the axioms or results in Section 2.1; please cite each axiom or result specifically when you use it.