MATH 200B, DUE 01/27.

(1) Let R be a ring with 1. Assume that R is a semisimple left R-module (R is a (left) semisimple ring). Prove that
   (a) Every left R-module is semisimple.
   (b) $R = I_1 \oplus I_2 \oplus \cdots \oplus I_n$ for some minimal left ideals I_i's.
(2) Let R be a left semisimple ring. Prove that there are finitely many simple modules $\{M_i\}_{i=1}^n$ such that, if M is a simple R-module, then $M \simeq M_i$ for some i. (Hint: use Schur's lemma (Section 10.3, 11).)
(3) Section 10.3: 18, 24, 27.
(4) Section 12.1: 3, 11, 12.

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