1. exercise 11.5.18, p 275
2. exercise 11.5.24, pp 276-277

3. Show that the following definitions of the probabilistic class \( ZPP \) are equivalent. Below, \( \epsilon \) will be a small fixed constant, and \( c,k \) fixed integers. (More or less straightforward. See p. 254 for a definition of \( RP \).)

(a) \( ZPP = RP \cap coRP \).
(b) \( L \in ZPP \) iff \( L \) is accepted by a probabilistic TM \( M \) which operates in polynomial time \( cn^k \), outputs “yes” or “no” with probability \( 1 - \epsilon \), and outputs “don’t know” with probability \( \epsilon \). Furthermore, if it answers “yes” or “no”, this answer will be correct.
(c) \( L \in ZPP \) iff \( L \) is accepted by a probabilistic TM \( M \) which answers correctly “yes” or “no” when it halts. It operates within time \( cn^k \) with probability \( 1 - \epsilon \), and exceeds this time bound with probability \( \epsilon \).