CS 228, Bayes' Theorem Exercises

Name:

Some questions are from **Discrete Mathematics and It's Applications 7e** by Kenneth Rosen.

- Suppose that 8% of all bicycle racers use steroids, that a bicyclist who uses steroids tests positive for steroids 96% of the time, and that a bicyclist who does not use steroids tests positive for steroids 9% of the time. What is the probability that a randomly selected bicyclist who tests positive for steroids actually uses steroids?

- Suppose that a Bayesian spam filter is trained on a set of 1000 spam messages and 400 messages that are not spam. The word "opportunity" appears in 175 spam messages and 20 messages that are not spam. Would an incoming message be rejected as spam if it contains the word "opportunity" and the threshold for rejecting a message is .9? You may assume that, overall, 50% of all messages are spam.

- Repeat the previous exercise under the assumption that the proportion of spam messages in the training set is reflective of the overall ratio of spam to non-spam messages.