Two topics, *Total Probability* and *Bayes' Rule*, are part of this course, but do not appear in the textbook. In your *Custom Solutions Manual* there is an appendix (pages 573–578) that presents this material and gives some example problems with solutions. This appendix is also available at `http://www.math.ohiou.edu/~mjm/20043/250/TotalP-Bayes.pdf`.

This handout gives a couple of practice homework problems on these topics. Your solutions will not be collected or graded.

1. A certain drug test has a probability of .02 of indicating that a person uses heroin, when in fact they do not (a false positive). The same test has a probability of .05 of indicating that a person does not use heroin, when in fact they do (a false negative).

    (a) Suppose that 2% of college students use heroin. What is the probability that this test will indicate that a randomly chosen college student uses heroin?

    (b) Suppose that you test a bunch of Ohio students, and 3% test positive. What is your best estimate of the percentage of Ohio students that use heroin?

    (c) Suppose that a friend of yours here tests positive. What is the probability that they actually use heroin?

2. You are a contestant on the TV game show **Let's make a Deal!**. The host, Monte Hall, shows you three doors. You know that behind one of them is $50,000 and behind the other two are lumps of coal, but you don't know which one is which. You get to pick a door, and will receive the prize behind it. After you have picked, Monte opens one of the other two doors, and reveals a lump of coal. He then offers you a deal: you can stick with the door that you have chosen, or trade for the other unopened door. Should you trade?