

Your Name: \_\_\_\_\_

Names of people you worked with: \_\_\_\_\_

**Instructions:** Work on this problem in class with your group (if you are attending class synchronously) or out of class (hopefully with a person or two! if you are attending class asynchronously). The problem should be done on a piece of paper with a pencil or on some kind of tablet. The problem should **not** be typed up or done in LaTeX.

Work for a *maximum* of 15 minutes on the problem (regardless of what time you are working). *Do not* come back to the problem to “fix it up” or “finish it.” Be sure to write down the names of the people you worked with during class (or outside of class).

Take a picture of your work and use a scanning app to create a pdf (or create a pdf directly from your tablet). Upload your work to Gradescope (via Sakai) within 24 hours of class.

**Task:** Suppose the rate of infection with TB is 1 in 1000 (about 0.1 percent = 0.001). Suppose a TB test is used which is 90% accurate: it gives a positive result for 10 percent of people who do not actually have TB, but do have a reaction to the skin test. Also, 10% of the people who actually have TB fail to react to the test.

1. What's the chance that someone has TB if they test positive?
2. What's the chance that a randomly chosen person who tests negative actually has TB?
3. There is another TB test which gives fewer false positives, but it is more expensive. Would it be better to use that one?
4.
  - What is the **prior** probability of having TB?
  - What is the **posterior** probability of having TB (given a positive test)?