

MTH 105: 10.2 Written Homework Due Tuesday 11-26-13

**Directions:** Show all work and clearly identify your answer for full credit. Answers with no explanation will not receive full credit.

1. Say an epidemic is on the loose. A vaccination against the epidemic costs \$20 and is expected to save 1 in 500 people. What is the cost per life saved for this vaccine?
2. Suppose a disease is expected to infect 2% of the population living in the United States. If there are 314,000,000 people in the United States, how many would expect to be infected?
3. One day at the laundromat, you met an attractive blonde stranger named Chris and wonder if you should pursue a relationship. Unfortunately, you have the nagging belief that Chris's golden locks may not be natural. However, you know several facts about the incidence of dyed hair and your ability to detect dyed hair. You know that 90% of blonde people in the world are naturally blonde. You have also done a personal survey and learned that you are 80% accurate in your ability to correctly categorize fake hair color as fake and real hair color as real. If you believe that Chris's hair is dyed, what is the probability that his fair hair is natural?
4. There are 1.1 million Americans living with HIV in the United States. There are about 314 million Americans in the United States. The ELISA blood test for HIV is accurate in detecting HIV 95% of the time in people with HIV. If a person doesn't have HIV, the test results in a negative 99% of the time. If you test positive for HIV, what is the probability that you actually have HIV?
5. The following table represents the results from a study done to determine the accuracy of a specific test. (These are made up)

800 people	Test Positive	Test Negative	Totals
Diseased	62	2	64
Not Diseased	8	728	736
Totals	70	792	800

- (a) If you test positive, what are the chances that you don't have the disease?
- (b) If you have the disease, what are the chances that you test positive?
- (c) If you don't have the disease, what are the chances that you test negative?
- (d) Do you think that this test should be used as a diagnostic tool?