

1. Thirty percent of a population has a certain disease. There is a test for this disease which is positive in eighty percent of the cases in which the disease is present and five percent of the cases in which the disease is not present:

- a)(15) If you are tested for the disease and the result is positive what is the probability that you have the disease?
- b)(10) If the test is negative, what is the probability that you don't have the disease.

2.(15) You roll two dice ten times and count the number of times you roll at least a three. Call this a success. What is the probability that you have at exactly two successes.

3.(15) You play the following game: you draw a card from a deck of fifty-two. If the card is a picture card you win five dollars, otherwise you lose x dollars. What should x be for the game to be fair. (Fair means the expectation is zero.)

4(15) Jar one contains 2 red and 4 white marbles. Jar two contains 4 red and 2 white marbles. You roll a single die. If it shows 1 or 2 you pick a marble from jar one. If it shows 3, 4, 5, or 6, you pick a marble from jar two. What is the probability you chose a red marble?

5. A sample of 20 T.V.'s contains exactly three defective ones:

- a)(10) If you pick 3 what is the probability they are all good?
- b)(5) If you pick 2 T.V.'s what is the expected number of good T.V.'s.

6.(15) You draw two cards without replacement. What is the probability that they are both red given that you know that neither one is a club?