March 18th WS: 1016-351: Coverage – 2.4, 2.5: Dr. Chulmin Kim

Name: _____

1. Sam and Theresa each roll a die. Whoever gets the higher number wins; if they both roll the same number, neither wins.

   a. What is the probability that Theresa wins?

   b. If Sam rolls a '3', what is the probability that he wins?

   c. If Sam wins, what is the probability that Theresa rolled a '3'?

   d. What is the probability that they are tied? (They roll the same.)

2. **[Incidence of a rare disease]** P(individual has the disease) = .001, P("+" | individual actually has the disease) = .99, and P("+" | individual actually does not have the disease) = .02. To use Bayes' Theorem, determine the P(individual actually has the disease | "+").

3. **[Smarty vs. Dummy]** Brown has recently been hired by a shop down town to help customers with various computer related problems. Lately, two different viruses have been bugging many customers — virus Dummy and virus Smarty. It is estimated that about 65% of the customers with virus problems are bothered by virus Dummy and the remaining 35% by virus Smarty. If the computer is infected by virus Dummy, Brown has a 90% chance of fixing the problem. However, if the computer is infected by the virus Smarty, this chance is only 70%.

   a. If a virus-infected computer is randomly selected from the shop, and we know it was fixed by Brown, what is the probability that it was infected with virus Dummy?

   b. A virus-infected computer is randomly selected from the shop. It is infected with virus Dummy. What is the probability that it cannot be fixed by Brown?

   c. A virus-infected computer is randomly selected from the shop. What is the probability that it is infected with virus Dummy and cannot be fixed by Brown?