

Test 2 Topics
MCS 115 - Fall 2008

Section 7.1/7.2:

- You should be familiar with the Let's Make a Deal scenario.
- You should be familiar with the Reunion Scenario (“I have two children . . .”). What are the odds of having two boys in each case? You should understand how tossing two pennies, ignoring two tails, and counting two heads relates to the Reunion Scenario.
- You should know that $P(E) = \frac{N}{T}$, i.e the probability of an event occurring is equal to the number of different outcomes giving E divided by the total number of equally likely outcomes. You should know that the set of equally likely outcomes is called the sample space and that an event is a subset of the sample space.
- You should be able to compute probabilities in the context of rolling dice, flipping coins, dealing cards etc. In other words, in any situation where it is reasonable that you can count equally likely outcomes, you should be able to compute probabilities.
- You should know what relative frequency is and how it relates to probability (via Law of Large Numbers).
- You should know that if the probability of an event happening is P , then $0 \leq P \leq 1$. The probability that the event does not happen is $1 - P$.
- You should understand the solution to the birthday problem. Given n people, you should be able to compute the probability that no two of them have the same birthday and the probability that at least two of them have the same birthday. You should be able to generalize your understanding of the birthday problem to other scenarios.
- You should know how to compute “conditional probabilities.” For example, if you toss a penny, a nickel and dime, and there is at least one head, what is the probability that all three are heads. See also 7.2: 15, 30.

Section 7.4:

- You should know how to systematically count the number of outcomes without necessarily listing them all and compute probabilities for simple situations such as flipping coins, rolling dice, and playing cards.
- You should know the difference between “the probability that both Event 1 and Event 2 occur” and “the probability that Event 1 or Event 2 occurs.”

Section 7.5:

- You should know how to use the one coin method and the two coin method for asking embarrassing questions. Given the results of a one coin or two coin method survey, you should be able to estimate how many people would actually answer an embarrassing question yes if they were telling the truth.

Section 8.1:

- You should understand the notion of expected value and be able to compute the expected value for a particular future event.

Section 8.2:

- You should understand the HIV/AIDs testing example and be able to compute various probabilities given different assumptions about infection rates and accuracies of tests.
- You should be able to generalize your understanding of the HIV/AIDs test to other testing scenarios, e.g. blondes, scholarships, taxis, and be able to compute probabilities given assumptions about test accuracy and fraction of the population with the characteristic of interest.