

You should know the following concepts:

1. Write a sample space and decide if it contains equally likely outcomes
2. Draw a tree model
3. Draw an area model
4. Compute probabilities using either of the above models
5. Compute expected value
6. Decide if two conditions are independent or dependent

Practice Problems

I am only providing answers for the actual probabilities. You should practice using tree and area models to compute them.

1. You have a 4-sided die, where the four sides are labeled 1, 3, 5, 7.
 - (a) What is the expected value of rolling this die?
 - (b) What is the probability that the sum of two rolls is at least ten?
 - (c) What is the probability that you roll at least one 5 in three rolls?
2. You have two spinners. One is divided into three equal sections, labeled 1, 2, and 3. The other is divided into four equal sections, labeled 3, 4, 5, and 7. You spin both spinners.
 - (a) What is the probability that the product of the spinners is odd?
 - (b) What is the probability of getting a 3 on at least one spinner?
 - (c) Are parts a and b independent?
3. You have a bag with four slips of paper in it, labeled one through four. You choose two slips of paper (without replacing the first slip in the bag). You receive a number of points equal to the product of the two numbers you drew.
 - (a) Write at least two sample spaces for this game
 - (b) What is the probability that you score at least six points?
 - (c) What is the expected value of playing this game?
4. You are going to select a random student here at UW. Decide if the following conditions are independent:
 - (a) I. The student is a senior. II. The student drank alcohol last weekend.
 - (b) I. The student is a senior. II. The student is an art major.
 - (c) I. The student plays in the band. II. The student attended the last football game.

Answers to the problems:

1. (a) 4
(b) $\frac{3}{8}$
(c) $\frac{37}{64}$
2. (a) $\frac{1}{2}$
(b) $\frac{1}{2}$
(c) No
3. (a) {1-2, 1-3, 1-4, 2-1, 2-3, 2-4, 3-1, 3-2, 3-4, 4-1, 4-2, 4-3}, {1-2, 1-3, 1-4, 2-3, 2-4, 3-4}, {2, 3, 4, 6, 8, 12}
(b) $\frac{1}{2}$
(c) 5.83 points
4. You are going to select a random student here at UW. Decide if the following conditions are independent:
 - (a) Probably dependent - seniors are more likely to drink alcohol than non-seniors, which include underage students.
 - (b) Probably Independent - art majors should be about the same percentage of seniors as of the whole student body.
 - (c) Probably dependent - nearly all of the band members will have attended the football game, but not nearly all of the students.