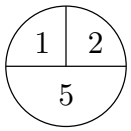
Practice for Midterm Exam I
Math 183, UCSD, Fall 2017
(Do not turn in!)

Exercise I

1. You roll three six-sided dice (numbered 1-6). One is red, one is blue, and the last one is green. What outcomes make up the event A that the sum of the three faces showing equals 5?

2. Two darts are thrown at the following target:



Write (x, y) for the outcome that the first dart lands in region x and the second dart, in region y.

(a) List the sample space of (x, y)'s.

(b) List the outcomes in the sample space of sums, $x + y$.

Exercise II

Sally gets a cup of coffee and a muffin every day for breakfast from one of the many coffee shops in her neighborhood. She picks a coffee shop each morning at random and independently of previous days. The average price of a cup of coffee is \$1.40 with a standard deviation of \$0.30, the average price of a muffin is \$2.50 with a standard deviation of \$0.15, and the two prices are independent of each other.

1. What is the mean and standard deviation of the amount she spends on breakfast daily?

2. What is the mean and standard deviation of the amount she spends on breakfast weekly (7 days)?

Exercise III

Suppose that three events A, B, and C are defined on a sample space S. Use the "or", "and", and parentheses to represent each of the following events:

1. none of the three events occurs

2. all three of the events occur

3. only event A occurs

4. exactly one event occurs

5. exactly two events occur

Exercise IV

The American Community Survey is an ongoing survey that provides data every year to give communities the current information they need to plan investments and services. The 2010 American Community Survey estimates that 14.6% of Americans live below the poverty line, 20.7% speak a language other than English (foreign language) at home, and 4.2% fall into both categories.

1. Are living below the poverty line and speaking a foreign language at home disjoint?

2. Draw a Venn diagram summarizing the variables and their associated probabilities.

3. What percent of Americans live below the poverty line and only speak English at home?

4. What percent of Americans live below the poverty line or speak a foreign language at home?

5. What percent of Americans live above the poverty line and only speak English at home?

6. Is the event that someone lives below the poverty line independent of the event that the person speaks a foreign language at home?

Exercise V

Four boxes, labeled 1-4, contain balls.

- Box #1 contains 3 red, 2 white, and 3 black balls;
- Box #2 contains 4 red, 3 white, and 1 black ball;
- Box #3 contains 2 red, 1 white, and 1 black ball;
- Box #4 contains 1 red, 6 white, and 2 black balls;

You pick an urn at random and, from this urn, you draw one ball at random.

1. Draw a tree diagram of this setup.

2. Make a contingency table of this setup.

3. What is the probability that the ball is not white?

4. If the ball you draw is red, what is the probability it has been drawn from Box #3?