Homework 1

Due May 19 before class meeting.

Q 1 and Q 2 are related to Equally likely outcomes, Interpretations of probability. Q 3 is related to Kolmogorov Axioms, Distributions. Q 4 and Q 5 are related to Conditional Probability and Independence.

Q 1. *Suppose a word is picked at random from the following sentence:*

> A fair die is rolled and the number on the top face is noted.

Find:

  a *the chance that the word has at least 4 letters;*

  b *the chance that the word contains at least 2 vowels (a, e, i, o, u);*

  c *the chance that the word contains at least 4 letters and at least 2 vowels.*

Q 2. *Pitman 1.2 Problem 1*

Q 3. *Suppose a word is picked at random from the following sentence:*

> A fair die is rolled and the number on the top face is noted.

  a *What is the distribution of the length of the word picked?*

  b *What is the distribution of the number of vowels in the word?*

Q 4. *Suppose:*

$$P(\text{rain today}) = 70\%; P(\text{rain tomorrow}) = 60\%; P(\text{rain today and tomorrow}) = 30\%.$$

Given that it rains today, what is the chance that it will rain tomorrow?

Q 5. *A hat contains a number of cards, with*

> *40% white on both sides;*

> *50% black on one side and white on the other;*

> *30% black on both sides.*

The cards are mixed up, then a single card is drawn at random and placed on the table. If the top side is black, what is the chance that the other side is white?