

Sheet 2: Introduction to Probability Theory

NOTE: All results should be rounded to two decimal places unless otherwise stated. If a number or result has fewer decimal places, it is okay to keep fewer.

Exercise 1

[D, Section 2.1, Exercise 2]

Exercise 2

[D, Section 2.1, Exercise 6]

Exercise 3

Read [D, Example 2.10] and solve [D, Section 2.1, Exercise 10]

Exercise 4

[D, Section 2.2, Exercise 13]

Exercise 5

[D, Section 2.2, Exercise 14]

Exercise 6

Given two events A and B , consider the following statements:

- (a) A and $B \cap A'$ are disjoint.
- (b) $(A \cap B)' = A' \cup B'$.
- (c) $(A \cup B)' = A' \cap B'$.

Verify these statements by drawing a Venn diagram for each (a), (b) and (c) and covering

- for (a), the interiors of A and $B \cap A'$;
- for (b), the interiors of $(A \cap B)'$, A' and B' ;
- for (c), the interiors of $(A \cup B)'$, A' and B'

with lines of different colors.

Exercise 7

[D, Section 2.3, Exercise 38]

It suffices to state the results as a sum/product of numbers, factorials, binomial coefficients ... For example, $6 \times 9!$ is sufficient, no need to calculate this further.

Exercise 8

Assume that 120 students are interested in taking a particular course during the shopping period. Because the default capacity of the course is only 86 students, those who cannot register immediately have to put themselves on the wait list. How many different wait lists can the instructor potentially see?