

Exercises 2*Instructor Name: John Lipor*

The below are in-class exercises designed to help solidify your understanding of the material covered in the notes. They will also aid you in completing some homework problems. Please work together with your group to complete as many of these problems as you can.

PN refers to the online textbook by Pishro-Nik available [here](#). Please do not look at the solutions until after you have completed the problem or received hints from me.

Exercise 1

PN 1.4.5, problem 1

Exercise 2

PN 1.4.5, problem 2

Exercise 3

PN 1.4.5, problem 3

Exercise 4

PN 1.4.5, problem 4

Exercise 5

PN 1.4.5, problem 9

Exercise 6

PN 2.1.5, problem 1

Exercise 7

PN 2.1.5, problem 2

Exercise 8

PN 2.1.5, problem 3

Exercise 9

PN 2.1.5, problem 4

Exercise 10

PN 2.1.5, problem 5

Exercise 11

There are three cards in a hat, each with two sides. One card is colored red/red, one is black/black, and one is red/black. Suppose you draw a card, look at one side only, and it is red. What is the probability that this is the red/red card?

Exercise 12

Show that if $P(A | B) > P(A)$, then $P(B | A) > P(B)$.

Exercise 13

Jane has decided to purchase three pets, each being a dog or lizard with equal probability of either animal independently of the others. Define the events

$$\begin{aligned} A &= \{\text{all pets the same animal}\} \\ B &= \{\text{at most one dog}\} \\ C &= \{\text{pets include at least one dog and one lizard}\}. \end{aligned}$$

- (a) Show that A is independent of B and B is independent of C .
- (b) Is A independent of C ?
- (c) Do (a) and (b) hold if each pet is not equally likely?

Exercise 14

Ten people enter an elevator at the basement of a building with 40 floors above.

- (a) What is $P(\text{fewer than ten stops})$?
- (b) What is $P(\text{stop on floors 39 and 40})$?