Stat 400 / Math 463 [BL1, CL1, DL1]: Homework 1

Spring 2020 - YU

Due: *Mon. Feb 3 – 2:00pm*

Instructions–

Please follow these instructions for all homework submissions this semester:

Turn-in options (choose one):

- At the end of lecture on the previous Thurs/Fri in the appropriate stack. **Please know the name of your TA.**

- At your assigned TA's **discussion** section (**not office hours**)

- Illini Hall Dropbox (by the elevators)

Formatting:

Top Right corner
- Full name (First + Last)
- netID (numbers and letters **e.g. jsnow1**).
- Your TA's name & Discussion section code (**e.g. Xinming - BD1, Eddie - BD2**),
- Homework number (**e.g. HW 1**)

Top Left corner
- **a STAPLE**

We will be returning homeworks in discussion the week *after* they are due. **Homeworks that are improperly formatted are likely to get lost and may not be returned.**

Exercise 1

The probability that Chloe is happy given that she has had dinner by 6pm is 0.9. The probability that Chloe is not happy given that she has not had dinner by 6pm is 0.8. Assume that there is a 60% chance that Chloe eats dinner by 6pm on a given day.

a)   If Chloe is not happy at 6pm, find the probability that she has not had dinner yet.

b)   If Chloe is happy at 6pm, find the probability that she has already had dinner.

Exercise 2

Find a value **c** such that

$$\iint_A c\, x^3 y^2 \, dx\, dy = 1$$

,

where $A = \{(x, y) : 0 < x < \sqrt{y}, 0 < y < 1\}$. Do not use a calculator or computer, except to check your work. Show your work for full credit!

Exercise 3

Suppose $S = \{2, 3, 4, 5, \dots\}$ and

$$P[k] = c\frac{3^k}{k!}$$

Find the value of c that makes this a valid probability distribution.

Exercise 4

Suppose $S = \{0,1,2,3,\ldots\}$ and

$$P[k] = \frac{1/3}{(3/2)^k}$$

Find P[Outcome is *greater* than 2].

Exercise 5

Suppose P[A] = 0.5, P[B'] = 0.3, and P[A ∩ B] = 0.2

a) Find P[A ∪ B]

b) Find P[B | A]

c) Find P[B'| A']

d) Find P[A | B]