

Class Exercise 5

Instructions

- Deadline: **Monday, March 2 (5:30 pm)**
- Please show all of your work on your submission. Notation counts. Poor notation will result in a loss of marks.
- Please leave your answers as exact values. If using decimals, please report your answer to four decimal places.
- You are encouraged to ask your instructor for help, and/or discuss ideas with your classmates. However, you must produce fully explained individual solutions.
- Under no circumstances may you simply copy solutions obtained online or from a classmate. In unclear cases, you may be asked to explain your solutions in a Teams meeting, and your work may be refused altogether.

1. Crime Shows and Questionable Life Choices

A group of students in a Probability and Statistics class were surveyed about the crime shows they binge-watch on Netflix instead of studying. Let the sample space, S , be

$$S = \{ \text{Breaking Bad, Narcos, Money Heist, Ozark, Sherlock, Peaky Blinders, Mindhunter, Dexter, The Wire} \}$$

Consider the following events:

$$\begin{aligned} A &= \{ \text{Breaking Bad, Narcos, Ozark, The Wire} \} && \text{Shows centered around drug empires} \\ B &= \{ \text{Money Heist, Peaky Blinders, Narcos} \} && \text{Shows involving organized crime gangs} \\ C &= \{ \text{Sherlock, Mindhunter, The Wire} \} && \text{Shows focused on detectives/investigators} \\ D &= \{ \text{Dexter, Breaking Bad, Ozark} \} && \text{Shows with morally ambiguous protagonists} \end{aligned}$$

Compute the following

- a. The set of shows that are centred around drug empires and involve organized crime gangs.
- b. The set of shows that are about drug empires and also focus on detectives or investigators.
- c. The set of shows that either involve organized crime gangs or focus on detectives/investigators (or both).
- d. The set of shows that are not centred around drug empires.

- e. The set of shows that neither involve organized crime gangs nor focus on detectives/investigators.
- f. The set of shows that do not involve organized crime gangs and do not focus on detectives/investigators.
- g. The set of shows that are either centred around drug empires and feature morally ambiguous protagonists, or focus on detectives/investigators and feature morally ambiguous protagonists.
- h. The set of shows that feature morally ambiguous protagonists but are neither centred around drug empires nor involve organized crime gangs.