Independence and Conditional Probability Solutions

Mini-Assignment 2022-09-08 - MTH 461 - Fall 2022

Instructions:

- Please provide complete solutions for each problem. If it involves mathematical computations, explanations, or analysis, please provide your reasoning or detailed solutions.
- Note that some problems have multiple solutions or ways to solve it. Make sure that your solutions are clear enough to showcase your work and understanding of the material.
- Creativity and collaborations are encouraged. Use all of the resources you have and what you need to complete the mini-assignment. Each student must take personal responsibility and submit their work individually. Please abide by the University of Portland Academic Honor Principle.
- There are two ways you can write your answers, a: by handwriting (either physically or digitally), or b: by typing on a template document with file type options, which can be downloaded from the course website.
- If you had handwritten your answers/solutions on a physical paper, make sure to label it properly and please scan your document using a scanner app for convenience. Suggestions: (1) "Tiny Scanner" for Android or (2) "Scanner App" for iOS.
- **Please save your work as one pdf file, don't put your name in any part of the document, and submit it to the Teams Assignments for this course. Your document upload will correspond to your name automatically in Teams.**
- If you have questions or concerns, please feel free to ask the instructor.

1. Consider an experiment where you draw *four* balls from an urn without replacement. There are 10 balls in the urn; 4 black and 6 red. Compute the probability of the following events. Write your solutions in standard probability notations.

    a. Draw exactly 3 black balls.
    b. Draw at least 3 black balls.
    c. Draw at most 3 black balls.
    d. Draw exactly 2 red balls.
    e. Draw at least 2 red balls.
    f. Draw at most 2 red balls.

2. Consider an experiment where you draw *three* cards from a standard deck without replacement. Compute the probability of the following events. Write your solutions in standard probability notations.

    a. Draw a king in the second draw.
    b. Draw a queen in the first draw.
    c. Draw at least one red face card.
    d. Draw at least one black face card.
    e. Draw a queen in the third draw given that queens are drawn in the first and second draws.
    f. Draw a king in the third draw given that any face card are drawn in the first and second draw.