Project II Research Project

CSCI 3327

## Question 1

Using the MLB ballparks dataset, create a relative frequency histogram for the minimum wall height (measured in yards).

|  |  |
| --- | --- |
| **Row Labels** | **Count of min\_wall\_height** |
| 3-4 | 0.033 |
| 4-5 | 0.067 |
| 5-6 | 0.033 |
| 6-7 | 0.067 |
| 7-8 | 0.167 |
| 8-9 | 0.433 |
| 9-10 | 0.133 |
| 11-12 | 0.067 |
| **Grand Total** | **1.000** |

## Question 2

Let be the set of all MLB ballparks that have a distance from the home plate to 'the nearest fence or obstruction' in left field that is greater than 340 yards. Let be the set of MLB ballparks have a distance from the home plate to 'the nearest fence or obstruction' in right field that is greater than 340 yards. Find and .

**Solution**

{Wrigley Field, Coors Field, Comerica Park, loanDepot park,

American Family Field}

{Wrigley Field, Coors Field, American Family Field}

{ Wrigley Field, Coors Field, Comerica Park, loanDepot park,

American Family Field}

{Wrigley Field, Coors Field, American Family Field}

{Comerica Park, loanDepot park}

## Question 3

A charity is hosting two baseball games and has the opportunity to choose two MLB ballparks for the events. The ballpark options consist of three warm-temperature ballparks (Truist Park, Chase Field, and Oriole Park at Camden Yards) and two cool-temperature ballparks (T-Mobile Park and Oracle Park).1 Let denote the number of warm-temperature ballparks in the selection. Assuming the two ballparks are chosen at random, find the probability distribution for .

1. In this example, a ballpark is considered a “warm-temperature ballpark” if the temperature is the average temperature is above 65 degrees Fahrenheit.

**Solution**

Based on the probability distribution, it is most likely that one warm-temperature ballpark will be selected.

Notice that for all .

## Question 4

Suppose that 10% of 30 total ballparks have an average temperature below 70 degrees Fahrenheit. A random sample of n = 8 ballparks will be selected, and , the number of ballparks with an average temperature below 70 degrees Fahrenheit, is to be observed. Find the probability of observing at least one ballpark with an average temperature below 70 degrees Fahrenheit.

**Solution**

It is likely that at least one ballpark with an average temperature below 70 degrees Fahrenheit is observed.

## Question 5

From a sample of 30 ballparks, 10 are randomly selected. What is the probability that the 10 randomly selected include all 5 of the ballparks with the greatest wall heights.

**Solution**

It is likely (Not very likely).

## Question 6

Suppose that a team plays games with an average of 1 homerun per game. Assume that possesses, approximately, a Poisson probability distribution. Calculate the probability that the team will achieve 0 homeruns during a game. What is the probability of achieving 1 homerun? 2 homeruns?

**Solution**

## Question 7

Suppose that the distribution function for, , the minimum wall height (measured in yards) is given by

Find what would be the probability density function for and explain why the function is not actually a density function.

**Solution**

One reason the function is not a density function because it violates the first property given by Theorem 4.2 which state that if is a density function for a continuous random variable, then for all .

For example, . Although the procedure for deriving the density function is correct here, it is difficult to accurately approximate a continuous distribution function and a continuous density function using knowledge from class and a discrete dataset.