**Assignment Questions**

Q1. Find the mean and standard deviation of X = Uniform(2,7)

**Answer:**

Input:

2

7

Output:

Mean:4.50

Standard Deviation:1.44

**Code:**

import math

print("Enter a:")

a=int(input())

print("Enter b:")

b=int(input())

mean = (a+b)/2

print("Mean:%.2f"%mean)

stdev=math.sqrt(((b-a)\*\*2)/12)

print("Standard Deviation:%.2f"%stdev)

Q2. The total duration of baseball games in the major league in the 2011 season is uniformly distributed between 447 hours and 521 hours inclusive. What is the probability that the duration of games for a team for the 2011 season is between 480 and 500 hours?

**Answer:**

**Test Case:**

Input:

447

521

480

500

Output:

0.27

Q3. Sample 1000 random numbers between 8 and 10 from a uniform distribution. Compute the probability that the numbers are

1. Greater than 8.5
2. Between 9 and 9.65
3. Less than 8.1

**Answer:**

**TestCase-1:**

Input:

100

Output:

Greater than 8.5: 0.751

Between 9 and 9.65: 0.332

Less than 8.1: 0.042

**TestCase-2:**

Input:

90

Output:

Greater than 8.5: 0.749

Between 9 and 9.65: 0.339

Less than 8.1: 0.053

**TestCase-3:**

Input:

150

Output:

Greater than 8.5: 0.741

Between 9 and 9.65: 0.327

Less than 8.1: 0.048

Q4: During placements at Bennett University, likelihood of receiving an off-campus interview invitation after a career fair booth visit depends on how well he/she did in probability and statistics. Specifically, an A results in a probability p = 0.95 of obtaining an invitation, whereas a C results in a probability of p = 0.15 of an invitation.

(a) Find the probability that the A student must visit 2 booths to get an invitation.

(b) Find the probability that the C student must visit 5 booths to get an invitation.

(c) On average, how many booth visits must an A student make before getting an off-campus interview invitation?

**Answer:**

Test Case:

0.0475

0.0783

1.0526

**Code:**

Q5: The heights of the kids are stored as elements ‘x’ inside the vector ‘X’. Calculate the density for a specific height x = 39, with mean as 37 and standard variance as 2.

Further, calculate the sum of densities for x in [35,39].

**Answer:**

**Test Case:**

Output:

0.12

0.79

**Code:**

import math

''' Probability Density Function (PDF) '''

def PDF(x, mean, std\_dev):

probability = 1.0 / math.sqrt(2 \* 3.141592\*(std\_dev)\*\*2) # first part of equation

probability \*= math.exp(-0.5 \* ((x - mean)/std\_dev)\*\*2) # multiply first part to second part

return probability

Q6. Sample 1000 random numbers from a normal distribution with mean 50 and variance 48. Compute the probability that the numbers are

I) Greater than 57

II) Between 59 and 69.65

III) Less than 50

**Answer:**

Test Case-1:

Input:

100

Output:

Greater than 57: 0.424

Between 59 and 69.65: 0.077

Less than 50: 0.513

Test Case-2:

Input:

90

Output:

Greater than 57: 0.467

Between 59 and 69.65: 0.08

Less than 50: 0.48

Test Case-3:

Input:

150

Output:

Greater than 57: 0.443

Between 59 and 69.65: 0.095

Less than 50: 0.51

**Practice Question**

Recall the question 3 from last week. This week you are supposed to make the probability values random and repeat the same question.

|  |  |
| --- | --- |
| X | P(x) |
| 1 | R1 |
| 2 | R2 |
| 3 | R3 |
| 4 | R4 |
| 5 | R5 |
| 6 | R6 |