Problem Statement 1: [50 marks]

The marks awarded for an assignment set for a Year 8 class of 20 students were as follows:

6 7 5 7 7 8 7 6 9 7 4 10 6 8 8 9 5 6 4 8

Solution:

Mean: 137/20=6.85

Total sum/Num of elements

Median:7

Mode:7 (Max occurrence’s)

S:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | Xbar | Diff | ABS | Pow(2) |
| 6 | 6.85 | -0.85 | 0.85 | 1.7 |
| 7 | 6.85 | 0.15 | 0.15 | 0.3 |
| 5 | 6.85 | -1.85 | 1.85 | 3.7 |
| 7 | 6.85 | 0.15 | 0.15 | 0.3 |
| 7 | 6.85 | 0.15 | 0.15 | 0.3 |
| 8 | 6.85 | 1.15 | 1.15 | 2.3 |
| 7 | 6.85 | 0.15 | 0.15 | 0.3 |
| 6 | 6.85 | -0.85 | 0.85 | 1.7 |
| 9 | 6.85 | 2.15 | 2.15 | 4.3 |
| 7 | 6.85 | 0.15 | 0.15 | 0.3 |
| 4 | 6.85 | -2.85 | 2.85 | 5.7 |
| 10 | 6.85 | 3.15 | 3.15 | 6.3 |
| 6 | 6.85 | -0.85 | 0.85 | 1.7 |
| 8 | 6.85 | 1.15 | 1.15 | 2.3 |
| 8 | 6.85 | 1.15 | 1.15 | 2.3 |
| 9 | 6.85 | 2.15 | 2.15 | 4.3 |
| 5 | 6.85 | -1.85 | 1.85 | 3.7 |
| 6 | 6.85 | -0.85 | 0.85 | 1.7 |
| 4 | 6.85 | -2.85 | 2.85 | 5.7 |
| 8 | 6.85 | 1.15 | 1.15 | 2.3 |

Total= 51.2

= 51.2/20-1

=sqr(2.69)

SVD=1.64

Problem Statement 2: [50 marks]

The number of calls from motorists per day for roadside service was recorded for a particular month:

28, 122, 217, 130, 120, 86, 80, 90, 140, 120, 70, 40, 145, 113, 90, 68, 174, 194, 170, 100, 75, 104, 97, 75,

123, 100, 75, 104, 97, 75, 123, 100, 89, 120, 109

Mean: 3763/35

=107.5

Median:100

Mode=75

S=

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | x Bar | Diff | ABS | Pow(2) |
| 28 | 107.5 | -79.5 | 79.5 | 6320.25 |
| 40 | 107.5 | -67.5 | 67.5 | 4556.25 |
| 68 | 107.5 | -39.5 | 39.5 | 1560.25 |
| 70 | 107.5 | -37.5 | 37.5 | 1406.25 |
| 75 | 107.5 | -32.5 | 32.5 | 1056.25 |
| 75 | 107.5 | -32.5 | 32.5 | 1056.25 |
| 75 | 107.5 | -32.5 | 32.5 | 1056.25 |
| 75 | 107.5 | -32.5 | 32.5 | 1056.25 |
| 80 | 107.5 | -27.5 | 27.5 | 756.25 |
| 86 | 107.5 | -21.5 | 21.5 | 462.25 |
| 89 | 107.5 | -18.5 | 18.5 | 342.25 |
| 90 | 107.5 | -17.5 | 17.5 | 306.25 |
| 90 | 107.5 | -17.5 | 17.5 | 306.25 |
| 97 | 107.5 | -10.5 | 10.5 | 110.25 |
| 97 | 107.5 | -10.5 | 10.5 | 110.25 |
| 100 | 107.5 | -7.5 | 7.5 | 56.25 |
| 100 | 107.5 | -7.5 | 7.5 | 56.25 |
| 100 | 107.5 | -7.5 | 7.5 | 56.25 |
| 104 | 107.5 | -3.5 | 3.5 | 12.25 |
| 104 | 107.5 | -3.5 | 3.5 | 12.25 |
| 109 | 107.5 | 1.5 | 1.5 | 2.25 |
| 113 | 107.5 | 5.5 | 5.5 | 30.25 |
| 120 | 107.5 | 12.5 | 12.5 | 156.25 |
| 120 | 107.5 | 12.5 | 12.5 | 156.25 |
| 120 | 107.5 | 12.5 | 12.5 | 156.25 |
| 122 | 107.5 | 14.5 | 14.5 | 210.25 |
| 123 | 107.5 | 15.5 | 15.5 | 240.25 |
| 123 | 107.5 | 15.5 | 15.5 | 240.25 |
| 130 | 107.5 | 22.5 | 22.5 | 506.25 |
| 140 | 107.5 | 32.5 | 32.5 | 1056.25 |
| 145 | 107.5 | 37.5 | 37.5 | 1406.25 |
| 170 | 107.5 | 62.5 | 62.5 | 3906.25 |
| 174 | 107.5 | 66.5 | 66.5 | 4422.25 |
| 194 | 107.5 | 86.5 | 86.5 | 7482.25 |
| 217 | 107.5 | 109.5 | 109.5 | 11990.25 |

S=38.77

Problem Statement 3: [100 marks]

The number of times I go to the gym in weekdays, are given below along with its associated probability:

x = 0, 1, 2, 3, 4, 5

f(x) = 0.09, 0.15, 0.40, 0.25, 0.10, 0.01

Calculate the mean no. of workouts in a week. Also evaluate the variance involved in it.

Mean=2.15

Sum(xi\*f(xi))/Sum(f(xi))

Variance=1.22

Svd=1.10

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | f(x) | Mean | Diff | power | f(x)\*power |
| 0 | 0.09 | 2.15 | -2.15 | 4.6225 | 0.416025 |
| 1 | 0.15 | 2.15 | -1.15 | 1.3225 | 0.198375 |
| 2 | 0.4 | 2.15 | -0.15 | 0.0225 | 0.009 |
| 3 | 0.25 | 2.15 | 0.85 | 0.7225 | 0.180625 |
| 4 | 0.1 | 2.15 | 1.85 | 3.4225 | 0.34225 |
| 5 | 0.01 | 2.15 | 2.85 | 8.1225 | 0.081225 |

Q. 3 coins are tossed independently. what is the probability to get at least 3 heads at most 2 heads at least 1 head and no tail?

Ans:

HHH

TTT

Possible number of outcomes:8

1/8

1-1/8

1-1/8

1/8

Q: s={a,b,c,d,e,f}

Each outcome is equally likely random variable is defined as follows :

Outcome a b c d e f

X 0 0 1.5 1.5 2 3

Determine the PMF of X and use that PMF for finding following probabilities:

1.p(x=1.5)=1/3=0.33

2. P(0.5<x<2.7)=053

3.P(x>3)=0=0

4.P(0<=x<=2)=

5.P(x=0 or x=2)=1/3+1/6=0.5