**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| **Name of company** | **Measure X** |
| Allied Signal | 24.23% |
| Bankers Trust | 25.53% |
| General Mills | 25.41% |
| ITT Industries | 24.14% |
| J.P.Morgan & Co. | 29.62% |
| Lehman Brothers | 28.25% |
| Marriott | 25.81% |
| MCI | 24.39% |
| Merrill Lynch | 40.26% |
| Microsoft | 32.95% |
| Morgan Stanley | 91.36% |
| Sun Microsystems | 25.99% |
| Travelers | 39.42% |
| US Airways | 26.71% |
| Warner-Lambert | 35.00% |

Solution: Refer to the notebook Assignment2\_set1

2.



Answer the following three questions based on the box-plot above.

1. What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.

Solution:

Inter Quartile range of data=Upper limit-Lower limit

From the graph,

Upper limit=12

Lower limit=5

IQR=12-5

=7

1. What can we say about the skewness of this dataset?

Solution:

The dataset is right skewed.

1. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?

Solution:

Then there would not be any outliers in the data.

3.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Solution:Approximately the mode lies between 4 to 8.

1. Comment on the skewness of the dataset.

Solution: The data is right skewed

1. Suppose that the above histogram and the box-plot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

Solution:

Both the plot helps in detecting the outliers and the skewness of data.

Mode is visible clearly in histogram whereas quantiles are clearly visible in box plot.

4.AT&T was running commercials in 1990 aimed at luring back customers who had switched to one of the other long-distance phone service providers. One such commercial shows a businessman trying to reach Phoenix and mistakenly getting Fiji, where a half-naked native on a beach responds incomprehensibly in Polynesian. When asked about this advertisement, AT&T admitted that the portrayed incident did not actually take place but added that this was an enactment of something that “could happen.” Suppose that one in 200 long-distance telephone calls is misdirected. What is the probability that at least one in five attempted telephone calls reaches the wrong number? (Assume independence of attempts.)

Solution:

If 1 out of 200 long distance telephone call is misdirected then

Probability of misdirected=p = 1/200

q=1-p=199/200

Probability of 1 out of 5 calls reaches the wrong number

n=5

P(x)=nCx.px.q(n-x)

P(x)=5C1.p1.q(5-1)

P(x)=5\*(1/200)\*(199/200)4

P(x)=0.0245

5.Returns on a certain business venture, to the nearest $1,000, are known to follow the following probability distribution

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

1. What is the most likely monetary outcome of the business venture?

Solution:

The most likely monetary outcome of the business venture is $2000 as

its probability is higher than rest others.

1. Is the venture likely to be successful? Explain

Solution:

The venture is likely to be successful.

Because, the probability of x=1000,2000,3000 is 0.2,0.3,0.4

respectively which when added gives 0.6 >0.5

1. What is the long-term average earning of business ventures of this kind? Explain

Solution:

The long term average earning of the company is given by Sum(x\*p(x))

=(-2000\*0.1)+(-1000\*0.1)+(0)+(1000\*0.2)+(2000\*0.3)+(3000\*0.1)

=-200-100+200+600+300

=$800

Therefore the average earning of the compant is $800

1. What is the good measure of the risk involved in a venture of this kind? Compute this measure.

Solution:

The good measure of the risk involved in a venture is the VARIANCE.

Higher the variance higher the Risk.

Variance=E(x2)-[E(x)]2

|  |  |
| --- | --- |
| x.p(x) | X2.p(x) |
| -2,00 | 400000 |
| -1,00 | 100000 |
| 0 | 0 |
| 200 | 200000 |
| 600 | 1200000 |
| 300 | 900000 |
| Total=800 | Total=2800000 |

Variance=2800000-8002

=2800000-160000

=2160000