**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% |

Ans:Please see the program



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.

**Ans : IQR=12-5=7 The maximum points are lies between 5 to 12 range. Middle 50% of data is packed into 7 units.**

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

**Ans: The skew is in right side**

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?

**Ans: The new box plot will not affect because the new value will come in upper whisker.Upper & lower whisker will same but the IQR can be vary(Q1,Q2& Q3).**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans: Mode lies between 4 and 8 i.e. 6.**

1. Comment on the skewness of the dataset.

**Ans:Skewness is right side**

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.

**Ans: In both the data representation it is clearly visible that the data is right-skewed.**

**Box plot provides a quick information about the minimum and maximum values, overall spread and the outliers in the dataset.**

**Histogram provides additional information like the mode, frequency, spread and kurtosis of the data.**

1. 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.)

Ans: one in 200 long-distance telephone calls is misdirected

=>  probability of call misdirecting  p = 1/200

     Probability of call not Misdirecting = 1 - 1/200 = 199/200

Number of Calls = 5

n = 5

p = 1/200

q = 199/200

at least one in five attempted telephone calls reaches the wrong number

= 1  -  none of the call reaches the wrong number

= 1  - P(0)

= 1  -  (199/200)⁵

= 0.02475

1. 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?

**Ans: The most likely outcome of this business venture is a return of $2000 as it has the highest probability of occurrence.**

1. Is the venture likely to be successful? Explain

**Ans:** **we can look at positive returns as a measure of success. The probability distribution gives us an idea about the long-term chances of earning given values of returns (indicated by x). Therefore, there is a (0.2+0.3+0.1) = 0.6 probability that the venture would be successful.In other words, the venture is 60% likely to succeed**

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

**Ans: The long term earning of business ventures of this kind lies between the range**

**$ -669.69 and $2269.69 because the standard deviation of the returns is $1469.69 and the average returns is $800.**

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

**Ans: Risk stems from the possible variability in the expected returns. Therefore a good measure to evaluate the risk for a venture of this kind would be the variance or the standard deviation of the variable X. The standard deviation of the returns is 1469.69. This large value of standard deviation considered along with the average returns of $800 indicates that this venture is highly risky.**