**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:**

Outliers: Morgan Stanley | 91.36%

Mean = 33.27%

Standard deviation = 0.1694

Variance = 0.0287



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.
2. What can we say about the skewness of this dataset?
3. 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:**

1. Inter-quartile range is approximately 7units. (IQR = Q3-Q1 = 12 – 5 = 7)

The interquartile range is difference between 75th and 25th percentiles of the data. It shows the statistical spread of data.

1. This data is right skewed.
2. The box plot will not show any outliers, since all values will come inside IQR\*1.5 range.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. Comment on the skewness of the dataset.
3. 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:**

1. The mode will somewhere in those two tallest peaks in histogram.

Approximate between 4 and 8.

1. Mean > Median > Mode

The data is right skewed.

1. Both plots are right skewed

Both plots have outliers near to 25.

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:**

Probability of calls getting misdirected, p =

Probability of calls getting right, q = 1 - =

The probability of calls getting misdirect, P(x) =

The probability of at least 1 call getting misdirect = P (X = 1 – P (X = 0)

1 – P (X = 0) = (5CO) = 1-0.999999960125 = 0.0000039875

The probability that at least one in five attempted telephone calls reaches the wrong number is approximately 0.0000039875, or about 0.0004%.

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?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

**Ans:**

1. Looking at the table, highest probability is 0.3 for x = 2000.

The most likely monetary outcome of this business will be $2000.

1. Probability of earning 0 or more profit is:

The chances of getting profits more than 0 are 80%, so venture is likely to be successful.

1. The long-term average earning of business ventures can be calculated using the expectation

Therefore, the long-term average earning of business ventures is $800.

1. The good measure of the risk involved in a venture of this kind id standard deviation.

The standard deviation of this venture is around $1470, which can be consider as risky by comparing to long-term earning.