**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**: The Outlier is 91.36

Mean ( = 33.271333333

Standard Deviation ( = 16.945400

Variance () = 287.14661238



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:** Q1=5, Q3= 12.5

IQR =Q3-Q1=12.5-5 = 7.5

The whole 75% data is lies in between 7.5 and the outlier will be found in the right side of data (Right skewness).

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

**Ans:** The data 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?

**Ans:** There will be no outliers affect the box plot.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans:** The mode of this dataset will be lie approx between 4.8-8.0

1. Comment on the skewness of the dataset.

**Ans**: The data set is positively 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.

**Ans**: Both box plot and histogram gives an idea of the skewness and presence of outliers in a dataset.

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 one call being misdirected(p) = 1/200

Number of attempts calls(n) = 5

Probability of no misdirected calls = (1-p)^5

= (1-1/200)^5

=0.9975

Probability of at least one misdirection call = 1-probability of no misdirected calls

= 1-0.9975

=0.0025

The probability that at least one in five attempts telephone calls reaches the wrong number is 0.0025.

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:** P=0.3 =2000

1. Is the venture likely to be successful? Explain

**Ans:** All positive probabilities = 0.2+0.3++0.1 = 0.6

60% change to success.

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

**Ans:** Long-term average earning = sum of expected values = 800$

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

**Ans:** A good measure of risk involved is standard deviation.

Standard deviation = 3212.37