**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:**

**Mean = 33.27% variance() = 287.146 standard deviation ( ) = 16.945**

**Outliers = 91.36%**

**Boxplot and outlier calculation are in the code file.**



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. **IQR = 12 -5 =7. It implies 50 % of the data set lie in this range , 25% to right of median and 25% to left of median.**
2. **As median of the data set is towards left side in IQR we can say it is right skewed data.**
3. **There would be no outliers in the data and the skewness values would reduce.**



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. **4 to8**
2. **Data is right skewed**
3. **From both plots we find 25 as an outlier and data has only one outlier.**

**Median of the data set is 6.**

**Both the plots indicate dataset is right skewed because in box plot the part to the right of median line is larger than to the left of median line and in histogram also we see the same.**

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: p( misdirected call) = 1/200**

**P( no misdirected call) = 199/200**

**P( at least one misdirected in 5 calls) = 1 – p(no mis directed in 5 calls)**

**= 1 – (5C5) \* (199/200)^5 \* (1/200)^0**

**=1 – 0.9752 = .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?
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. **E(x) = (-2000\*0.1) +(-1000 \*0.1) +(0)+(1000\*0.2) +(2000\*0.3) +(3000\*0.1)**

**= 800**

1. **Yes the venture is likely to be successful because the expected return on the business venture is coming profitable ( +$800 )**
2. **The long term average earning of business is $800.**
3. **A good measure to evaluate the risk would be standard deviation of the variable:**

**Sd = 1870.83**

**The large value of standard deviation of $1870 is considered along with the average returns of $800 indicates that this venture is highly risky**