**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% |

The following is the outlier in the boxplot: Morgan Stanley 91.36% measure\_x.describe() Mean = 33.271333 Standard deviation = 16.945401 measure\_x.var() Variance = 287.1466123809524



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 means the range of values that resides in the middle part that is between 75th and 25th percentiles of the data.

IQR=12-5=7

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

Ans: it is positively 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:** Then there would be no Outliers on the given dataset because of the outlier the data had positive skewness it will reduce and the data will normal distributed



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: The mode of data lie between approximately 4-8.

1. Comment on the skewness of the dataset.

Ans: 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.

Histogram is more suitable in finding out the mode, whereas box plot is suitable for mean.

Also in histogram graph is normally distributed or not is easily seen. And in box outliers are

Easily seen.

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)= 1/200

probability of calls not getting misdirected(q)=199/200

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ P(x) = (nCx) (p^x) (q^n-x)

= (5C1) (1/200)^1 (199/200)^5-1 P(1)

= 0.0245037

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 monetary outcome of the business venture is 2000$ As for 2000$ the probability is 0.3 which is maximum as compared to others.

1. Is the venture likely to be successful? Explain

Ans:yes, probability of venture making more than 0 or profit is(0.2+0.2+0.3+0.1)=80%.

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

Ans: the long tern average is expected value=x\*p(x)=800

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

Ans: The good measure of the risk involved in a venture of this kind depends on the Variability in the distribution. Higher Variance means more chances of risk Var (X) = E(X^2) –(E(X))^2 = 2800000 – 800^2 = 2160000