**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 – 0.37629

STD – 0.2245065

Variance = 0.05040

Outlier = 0.9136



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 = Q3 – Q1

= 12-5

= 7.

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

Ans. Data is + ve skewed or 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. Then Q1 and Q3 values changes and median values can be change.

* Skewness values is increases



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans. BI-modal

1. Comment on the skewness of the dataset.

Ans. +ve skewed data

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.
2. 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 1 wrong number out of 200 : P(WN) = 1/200 = 0.005

🡪 Probability of not wrong number : 1 - P(WN) = 1 - 1/200 = 0.995

Probability of at least one wrong number out of five

= 1 -Probability of all five calls are not wrong number

= 1 - (1 - P(WN))^5

= 1 - (1-0.005)^5

= 1 - 0.975

= 0.025

= 2.5%

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. E = Summation of X \* P(x)

= -2000 \* 0.1 - 1000 \* 0.1 + 0 \* 0.2 + 1000 \* 0.2 + 2000 \* 0.3 + 3000 \* 0.1

= -200 - 100 + 200 + 600 + 300

= 800 or = 2000$

1. Is the venture likely to be successful? Explain

Ans. the venture countries the business then eventually it will be successful, since the probability of the non-negative number is greater than 0.5 and expected values is + ve.

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

Ans. The long-term average is Expected value = Sum (X \* P(X)) = 800$ which means on an average the returns will be + 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