**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% |

**Solution**

Outlier is Morgan Stanley which is measured at 91.36%

|  |  |
| --- | --- |
| Mean | 0.33271333 |
| Standard Deviation | 0.16945401 |
| Variance | 0.02871466 |



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.

IQR = Q3-Q1 = 12-5 = 7

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

The data set is negatively skewed as the mass of the distribution is on the right side.

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?

The outlier will not be present with the change in the value.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

The mode of the dataset lies between 8 to 10 frequency

1. Comment on the skewness of the dataset.

The dataset is positively skewed as the mass of the distribution is located on the left side.

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.)

One wrong number out of 200 Probability of wrong number: P(WN) = 1/200 = 0.005

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

Probability of at least one out of five is a wrong number= 1 – Probability that all five calls are not wrong numbers

= 1 – (1 – P(WN))^5

= 1 – (1- 0.005)^5

= 1 – 0.975

= 0.024

= 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?

$2000, as the probability is at the highest.

1. Is the venture likely to be successful? Explain

Yes, as the probability of getting positive returns is higher than the probability of negative returns and the expected value is at $800.

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

Expected Value = Sum(x.p(x))

−$2000 ∗ 0.10 − $1000 ∗ 0.10 + 0 + $1000 ∗ 0.20 + $2000 ∗ 0.30 + $3000 ∗ 0.10 = $800

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