**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% |

Mean = 33.27133333333333

Variance = 287.1466123809524

Standard Deviation = 16.945400921222028



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.

Sol: 12-5=7

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

Sol: It is right Skewed

1. If it was found that the data point with the value 25 is actually 2.5, how would the new boxplot be affected?

Sol: It affects the mean of data



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Sol: The mode of dataset would lie around 5

1. Comment on the skewness of the dataset.

Sol: The data is Right skewed.

1. Suppose that the above histogram and the boxplot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

Sol: The graph provide information about skewness whether id left skewed or Right skewed, mode, median and the outlier.

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.)

Sol:

probability of call misdirecting p = 1/200

     Probability of call not Misdirecting = 1 - 1/200 = 199/200

Number of Calls = 5

P(x) = ⁿCₓpˣqⁿ⁻ˣ

n = 5

p = 1/200

q = 199/200

at least one in five attempted telephone calls reaches the wrong number

= 1 - none of the call reaches the wrong number

= 1 - P (0)

= 1   - ⁵C₀ (1/200) ⁰ (199/200) ⁵⁻⁰

= 1 - (199/200) ⁵

= 0.02475

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?

Sol: most likely monetary outcome of the business venture is 2000

1. Is the venture likely to be successful? Explain

Sol: Hence if X is 1000, 2000 or 3000

Probability is 0.2 + 0.3 + 0.1 = 0.6

as 0.6 > 0.5 Hence Venture is Successful

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

Sol: long-term average earning of business ventures = E(X)

E(X) = ∑ X.P(X) = 800

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

Sol: Var (X) = E(X²) – [E(X)] ²

=   2800000 -   800²

= **2160000**

SD = √Var =**1470**

As **Variance is Quite high** hence **Risk is high.**