**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:-

Outliers: 91.36

Mean (μ): 33.27

Standard Deviation (σ): 16.37

Variance (σ^2): 268.00



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:** Q1 = 5, Q3 = 12, Median = 7

(Inter-Quartile Range) IQR = Q3 – Q1 = 12 – 5 = 7

Second Quartile Range is the Median Value

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

**ANS: -** The data is skewed towards the right. It is not a normal distribution. Mean>median.

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

Ans: In this case there will be no outliers present in the data set. So, it will have normal distribution.

Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans**: The mode would approximately lie between 5 to 10.

1. Comment on the skewness of the dataset.

Ans: It is Right skewed. Mean>Median>Mode.

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.

Ans: they both have right-skewed and also has approximately same outliers and median.

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: Let's denote:

n as the number of trials (telephone calls),

p as the probability of success (getting the wrong number), and

q as the probability of failure (getting the right number).

n=5

p=1/200

q=1-1/200

P(x) = at least one in five attempted telephone calls reaches the wrong number

P(x)=(nCx)(p^x)(q^n-x)

P(x)=(5C1)(1/200)^1(199/200)^4 #[nCx=n!/x!-(n-x)!]

P(x)-0.0245

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: Most likely monetary outcome of the business venture will be $2000 as there is only one which has the highest probability amongst all.

1. Is the venture likely to be successful? Explain

Ans: According to the probability of the positive figures it is 0.8 which is 80% profitability, So yes the venture is likely to be successful.

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

= E(X^2) =X^2\*P(X) | E(X) =Sum X.\*P(X)

= 2800000 – 800^2

= 2160000