**.0Topics: 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% |



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. This value implies that 50% of the data lies near this range.

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

Ans: The right tail is longer than the left tail. This dataset is positively Skew.

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: The new box plot will have no outliers. All the data will lie inside the boxplot. So the dataset will be normally distributed.

3.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: Mode of this dataset lies on the values 5 and 10 or approximately between 4 to 8.

1. Comment on the skewness of the dataset.

Ans: The dataset is Positively Skew as the right tail is longer. 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: Both these dataset shows same Skewness and both have the same outlier. The median is visible in box plot while the mode is visible in histogram.

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:  IF 1 in 200 long-distance telephone calls are getting misdirected.  
Probability of call misdirecting = 1/200

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

The probability for at least one in five attempted telephone calls reaches the wrong number,

Number of Calls = 5 n = 5 p = 1/200 q = 199/200

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

P(x) = ⁿCₓ×pˣ×qⁿ⁻ˣ

P(1) = (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 the probability of $2000 is 0.3 is maximum as compared to others.

1. Is the venture likely to be successful? Explain

Ans: Yes. the probability that the venture will make more than 0 or a profit.

P(x>0)+P(x>1000)+P(x>2000)+P(x=3000) = 0.2+0.2+0.3+0.1 = 0.8

This states that there is a good 80% chances for this venture to be making a profit.

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

Ans: The long term average is expected value E(x),

E(x) = ∑x\*P(x)

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

= $ 800.

This means that on an average return 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 variance in the distribution. Higher Variance means more chances of risk.

Var(x) = E(x2) –(E(x)2)

= 2800000 – 640000

= 2160000.