**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% |



Answer the following three questions based on the box plot above.

1. What is the inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.

**Sol:** Here clearly 25 is the outlier.

Median = 7

1st quartile = 5

2nd quartile = 12

IQR = (12-5) = 7

IQR tells us the range of the middle half of the data.

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

**Sol:** Positively 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?

**Sol:** In that case, there would have been no outliers, and it might have affected the values of the mean and median slightly. The boxplot might have moved towards rights lightly.

3)



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Sol:** Between 5-8(Most frequent data)

1. Comment on the skewness of the dataset.

**Sol:** It is positively skewed.

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.

**Sol:** By comparing both of them it is very clear that the data would be positively skewed. Also, would help us finding mean, mode value.

4. 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 getting misdirected = (1/200)

Hence probability of call not getting misdirected = 1-(1/200) =199/200

Number of phone calls attempted = 5

Therefore, the probability that at least one in 5 attempted calls reaches the wrong number is:

=1-(199/200) ^5

=0.025

5. 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 probability of 2000$ is maximum (0.3), Here the highest probability is for 2000$.

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 = Sum (X \* P(X)) = 800$ which means on an average the returns will be 800$ and more.

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

Total

800

Income(x\*P(X)

-200

-100

0

200

600

300

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.

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

Var 86666

Std 294.3

X\*P(X)

-2

-1

2

6

3