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

Ans: Q3(Third Quartile) = 12(appox) , Q1(First Quartile) = 5

Inter Quartile Range(IQR) = 12-5 = 7.

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

Ans: It is Positive Skewness because outliers are present on the tail side towards Right.

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: There Would be no Outliers because the data has positive skewness it will reduce outliers and the data will be normally distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: The mode of the dataset would lie between range of 4 to 8.

1. Comment on the skewness of the dataset.

Ans: It is Positive skewness because the outliers is lying towards the tail.

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 are right-skewed and both have outliers the median can be easily visualized in box plot where as in histogram mode is more visible.

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: Probability that one call is misdirected = 1/200

Probability that call is not misdirected = 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?

Ans: most likely monetary outcome of the business venture is2000$ and its probability is 0.3

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 and hence this venture is going to be successful.

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

Ans: Expected Value =**Σ** X.P(X) = (-2000)(0.1)+ (-1000)(0.1)+ (1000)(0.2)+ (1000)(0.2)+ (2000)(0.3)+ (3000)(0.1) = (-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 the risk will be depending on the variability in the distribution

Var (X) = E(X^2) –(E(X))^2

E(X^2) = ((-2000)^2\*(0.1)+ ((-1000)^2\*(0.1)+(0)^2\*(0.2)+ ((1000)^2\*(0.2)+

((2000)^2\*(0.3)+ ((3000)^2\*(0.1) = 2800000

E(X)^2 = 800^2 = 640000

Var (X) =2800000 – 640000 = 2160000