**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% |

Outliers = 91.36 % (Morgan Stanley)

Mean () = 33.27

Std dev = 16.94

= 287.146



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.
2. What can we say about the skewness of this dataset?
3. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?
4. IQR = U.R – L.R

= 12.5- 5

= 7.5

Middle range or median is approx 7.5 and data is right skewed .The boxplot is viscous between 0 to 19 and has 1 outlier.

1. Data is right skewed or is positively skewed and not showing a normal distribution.
2. In this case then there would be no outliers and data will be distributed normally as it reduces positive skewness.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. Comment on the skewness of the dataset.
3. 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.
4. Mode of the dataset will lie between 5 to 10 approx.
5. Dataset is right skewed.
6. Both the figures are right skewed (boxplot and histogram) and have outliers; median in boxplot is more visible while in histogram mode is more visible.
7. 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.)

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(x)

= (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?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure
5. Monetary outcome = (x \*P(x))

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

= 800

The x = 2000 has maximum prob. i.e. 0.3 (most likely)

1. Yes, the probability that the venture will make more than 0 or a profit is 0.2+0.2+0.3+0.1 = 0.8 this states that there are a good 80% chances for this venture to be making a profit.
2. The long term average earning is 800, which means an average will return with + 800. As, it shows bionomial distribution.

= (0.1) (−2,000) + (0.1) (−1,000) + (0.2) (0) + (0.2) (1,000) + (0.3) (1,000) + (0,1) (3,000)= 800

1. Good measure is variability distribution = Var (X) = E(X^2) –(E(X))^2

= 2800000 – 800^2

= 2160000