**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% |

**Solution: file attached in the name of Assignment 2(Sushanth).ipynb**



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 . It means 50% of data points lie in the range of 5 and 12

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

Ans) The dataset is positively skewed. Tail is found extending towards right side of the curve.

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 mean value would change.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans) The mode lies between 5-7

1. Comment on the skewness of the dataset.

Ans) Positive 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.

Ans) Skewness of both the plots is same.

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) One wrong number out of 200

Probability of wrong number :P(wrong number)=1/200=0.005

Probability of not wrong number: 1-P(wrong number)=1-1/200=0.995

Probability of at least one out of five is a wrong number:

= 1-probability that all the five calls are not wrong numbers = 1- (1-P(wrong number))^5

= 1-(1-0.005)^5

= 1-0.975

=0.024 ≈ 2.5%

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) X=2000 with highest probability of 0.3

1. Is the venture likely to be successful? Explain

Ans) since the probability of non- negative returns is more than 0.5 which is 50%, the venture will be successful if these rates are maintained.

0.2+0.3+0.1=0.6

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

Ans) P(X)\*X = (-2000\*0.1)+(-1000\*0.1)+(0\*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) Standard deviaion