**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.
2. First Quantile Range, Q1 = 5.

Third Quantile Range Q3 = 12,

Median (Second Quartile Range) = 7

Inter-Quartile Range, IQR = Q3 – Q1 = 12 – 5 = 7 Second Quartile Range is the Median Value

1. What can we say about the skewness of this dataset?
2. Median is towards the left side, it is right skewed.
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. If the data point with value 25 is actually 2.5, there would be no outliers on thie given data set, and the data could be normally distributed also.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. The mode of this data set is approximately between 4-8.
3. Comment on the skewness of the dataset.
4. Mean is greater than the Median, it is Right-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.
2. Both the histogram and the box-plot are right-skewed and have outliers which can be seen clearly. The median can easily be visualized in the boxplot.
3. 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.)
4. n=5 (five attempted telephone calls)

p=1/200​ (probability of a misdirected call, assuming one in 200 calls is misdirected)

x≥1 (at least one misdirected call)

P(at least one success) = 1 – P(no success)

Probability of no success for N trials is

Subbing n and P in equation :

P ( at least one success) =

P (at least one success) = 1 – 0.024875

P (at least one success) = 0.975 or 97.51%

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. Most likely monetary outcome of the business is 2000$ as it has the highest probability distribution.
3. Is the venture likely to be successful? Explain
4. Yes, because the probability for (x>0) is higher than the probability for (x<0).
5. What is the long-term average earning of business ventures of this kind? Explain
6. Long term avg is Expected Value = SUM(X \* P(x)) = 800$.

1. What is the good measure of the risk involved in a venture of this kind? Compute this measure
2. P(x>=0) = P(0) + P(1000) + P(2000) + P(3000)

= 0.2 + 0.2 + 0.3 + 0.1

= 0.8