**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.

**12-5 = 7**

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

**The data is Right skewed. It implies that the data is densely concentrated towards the left of the distribution.**

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?

**The width of the boxplot tends to extended towards the left ( LQ < 5).**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie? **4-8**
2. Comment on the skewness of the dataset. **Right Skewed**.
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.

**Here the histogram is providing a detailed distribution of the data-points, whereas the boxplot provides the median, 25th and 75th percentile, min/max values and also separates the points which are considered outliers.**

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.)

**Solution:**

**One in 200 long-distance telephone calls is misdirected**

**=> probability of call misdirecting p =1/200**

**Probability of call not Misdirecting = 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 - 5C (1/200) (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?

**2000 is the most likely monetary outcome as it has the highest probability = 0.3**

1. Is the venture likely to be successful? Explain

**x.P(x) = [-200 + -100 + 0 + 200 + 400 + 600 + 300]= 800. Since the expected earning is +ve the venture would be a success.**

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

**Long term average earning of business ventures = 800$**

1. What is the good measure of the risk involved in a venture of this kind? Compute this measure

**The measures include R-squared, standard deviation.**