**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 the interquartile range of this dataset? (please approximate the numbers) .

In one line, explain what this value implies.

1. What can we say about the skewness of this dataset?
2. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?

(i) Minimum = 0

Maximum = 19

Q1 = 5

Q3 = 12

IQR = 12-5 = 7

The middle half of the dataset is 7 from 5 to 12 and the IQR is inclusive.

(ii) The dataset is positively skewed.

(iii) If the data point is 2.5 instead of 25 the entire box plot would remain the same

except the values would be divided by 10 each.



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.

(i) The mode of the dataset is the value on the X axis where the peak of the

histogram would lie. The mode will lie at approximately 5.5

(ii) The dataset is left skewed.

(iii) The graphs drawn as for the same dataset as both the graphs are skewed similarly

to the left.

The minimum lies at 0 and the maximum lies at 19. The outlier is at 25 and the

median is at 7.

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.)

Out of 200 long distance calls only one call is misdirected.

Probability of misdirection of each call is 1/200 = 0.005

Probability of at least one call being misdirected out of 5 is 0.005 + 0.005\*0.005 + 0.005\*0.005\*0.005 + 0.005\*0.005\*0.005\*0.005 + 0.005\*0.005\*0.005\*0.005\*0.005

= 0.005 + 0.000025 + 0.000000125 + 0.00000000625+0.00000000003125

= 0.00502513128125

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.

The venture is likely to be successful as the Expected Value of the probability distribution is quite high.

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

The long term average earning is the sum of all the values added together and divided by the total.

(-2000-1000+0+1000+2000+3000)/6 = 500

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

The risk in this venture can be measured using the negative expected value such as

-2000\*(0.1)-1000\*(0.1) = -300