**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.

**Solution** : First Quartile range is 5

Third Quartile range is 12

So IQR=Q3-Q1

=12-5= **7** (i.e Middle Quartile Range)

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

**Solution** : Right Skewed data and median is towards the left side so the data is not normally distributed.

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?

**Solution** :  In this case there is no Outliers on the given dataset because of the outlier. The data has positive skewness it will reduce and the data will normal distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Solution** : The mode of this data set lie in between 5 to 10 and approximately between 4 to 8

1. Comment on the skewness of the dataset.

**Solution** : Right – Skewed Data

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.

**Solution** : In boxplot Median is easily visible and in histogram mode is more visible. Both are positively skewed with 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 : IF 1 in 200 long-distance telephone calls are getting misdirected.  
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) = (nCx) (p^x) (q^n-x) # nCr = n! / r! \* (n - r)! P(1) = (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?

**Solution** : The most likely monetary outcome of the business venture is 2000$ As for 2000$ the probability is 0.3 which is maximum as compared to others

1. Is the venture likely to be successful? Explain

**Solution** : Yes, there are 60% chances of getting a positive return and 20% chances of negative returns or debts

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

**Solution** : The long-term average is Expected value = Sum (X \* P(X)) = $800 which means on an average the returns will be + $800

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

**Solution** : Good measure is, Positive returns (profits) probability tends to be more than negative returns (loss). i.e. 60% probability of profits and 20% probability of loss