**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% |

Ans. Outlier- Morgan Stanley=91.36%

Mean= 33.27, Var=287.14, SD=16.94.



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

Ans. 1) IQR = Q3 – Q1 (Q1 = 5, Q3 = 12), IQR = 12 – 5 = 7.

2) It shows positive or right skewness, its median is towords the left side.

3) The outlier present at 25 and if the 25 becomes 2.5 then this point will not have an outlier



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.

Ans. 1) Mode is lie between the range of 4 to 8.

2) The given data shows positive skewness or right side skewness.

3) In boxplot, median can be visualized and in histogram, mode can be easily visualized, both have right sided skewness.

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. Probability of call misdirecting = 1/200,

Probability of call not misdirecting = 1 – 1/200 = 199/200,

No. of calls = 5, P(0)= None of the call reaches wrong no., P(0) = 1\*(1/200)/(199/200)^5= 1/199,

At least one call wrong in five attempted calls = 1 - (1/199)^5 = 0.024.

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
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

Ans. 1) The most likely monetary outcome of the business venture is 2000$ and its probability is 0.3.

2) Probability of the venture will make 0 or 0< profit is =(0.2+0.2+0.3+0.1)=0.8, so there is 80% chance of venture would be successful.

3) The long term average = Sum(X\*P(X)) = 8000$ , average earning = 8000$.

4) The good measure of the risk involved in venture is depends on variability in distribution,

Variance = E(X^2) – [E(X)]^2 = 2800000 – 800^2 = 2160000.