**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.

Ans: Approximately , Q1(First Quantile Range)=5, Q3(Third Quatile Range)=12, Q2(Second Quatile Range)= 7 so, IQR(Inter Quatile Range)=Q3 - Q1=12 – 5 = 7,

Second Quatile Range is the Median value.

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

Ans: Right-Skewed, median is towards the left side it is not normal 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?

Ans: In that case there would be no outliers on the given dataset because the oulier data had positive skewness and data will normal distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: The mode of this dataset lie in between 4 to 8

1. Comment on the skewness of the dataset.

Ans: Right-Skewed. Mean>Median>Mode

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.

Ans: They both are right-skewed and both have outliers the median can be easily visualized in box plot where as in histogram mode is more visible.

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: If 1 in 200 long distance telephone calls are getting misdirected,

Then probability of calls misdirecting is 1\200 and

Probability of not misdirecting is 199/200

Number of calls(n)=5,

p=1/200,

q=199/200,

x=1

P(x)= ⁿCₓ pˣ qⁿ⁻ˣ

= (5C1)(1/200)^1(199/200)^5-1 = 0.0245

So probability of at least one in five attempted calls reaches wrong number is 0.0245

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?

Ans: The most likely monetary outcome of the business venture is 2000$ because 2000$ having more probability compared to others which is 0.3

1. Is the venture likely to be successful? Explain

Ans: Yes, because P(x) is greater than zero, that means business is more likely to get profit.

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

Ans: The long-term average is Expected value

=((-2000\*0.1)+(-1000\*0.1)+0+(1000\*0.2)+(2000\*0.3)+(3000\*0.1)) = 800

It means log-term average returns will be +800$

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

Ans: Probability(x>=0)=prob(0)+prob(1000)+prob(2000)+prob(3000)

=0.2+0.2+0.3+0.1 = 0.8