**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: **Outliner = 91.36%** (Morgan Stanley)

**Mean** =33.271

**Standard Deviation**=16.945

**Variance**=287.146



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.

Answer : Inter Quartile Range = 3rd Quartile-1st Quartile

= Q3-Q1

= 12-5

**IQR = 7**

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

Answer : Its Rightly Skewed

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?

Answer: In this case there is no outlier,because of the outlier the data had 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?

Answer : The mode of the dataset lies in between 4 to 8

1. Comment on the skewness of the dataset.

Answer : It is positively skewed.

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.

Answer: By comparing both they are right skewed. Histogram provides frequency distribution and Boxplot quantile distribution i.e here 50% data lies between 5 and 12 .Median can be visualized in the Boxplot whereas mode is visible in Histogram.Boxplot provides whisker length to identify outliers and in histogram looking at the gap that 25 may be outlier.

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.)

Answer : Probability of getting call misdirected **(p)**= 1/200

Probability of getting call not misdirected **(q)** = 1-(1-/200) =0.995

No of telephone calls attempted**(n)** =5

P(x)=at least one in five attempted telephone calls reaches the wrong no

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ

= (5C1 )\*(1/200)^1\*( 0.9956)^ 5-1

= 5\*0.005\*0.98251

**P = 0.02456**

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?

Answer : Max P =0.3 for x(2000)

1. Is the venture likely to be successful? Explain

Answer : Yes probability that venture will make more than 0 or Profit is

p(x>0)+p(x>1000)+p(x>2000)+p(x=3000) = 0.2+0.2+0.3+0.1 = 0.8 this states that there is good 80% chances for this venture to be making a profit

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

Answer : The long term average is Expected value = Sum (X\*P(x))

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

=800$

Here,long term average gives positive numbers,so the business venture is likely to be successful.

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

Answer: P(Loss)=0.2 . So the risk involved in venture is 20%.