**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. Morgan Stanley is the outlier here.

Mean = 33.2713

Variance = 287.146

Std. Dev. = 16.945



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. Q3-Q1 = 12-5 = 7

Minimum = Q1 - 1.5(IQR)

= -3.5

Maximum = Q3 + 1.5(IQR) = 22.5

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

Ans. Positive skew

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. - Box plot is plotted by using the median of the data. Median is not affected by the lower extreme or higher extreme values.

In above box plot 25 is the outlier if it is 2.5 then median value moves to the very next positive data point of the data.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans. Two peaked points are same

1. Comment on the skewness of the dataset.

Ans. Right 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.

Ans. Both the sets are right skewed and outliers lie at the same place.

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.one in 200 long-distance telephone calls is misdirected

=> probability of call misdirecting p = 1/200

Probability of call not Misdirecting = 1 - 1/200 = 199/200

Number of Calls = 5

P(x) = ⁿCₓpˣq ⁿ⁻ˣ

n = 5

p = 1/200

q = 199/200

at least one in five attempted telephone calls reaches the wrong number

= 1 - none of the call reaches the wrong number

= 1 - P (0)

= 1 - ⁵C₀(1/200)⁰(199/200)⁵⁻⁰

= 1 - (199/200) ⁵

= 0.02475

probability that at least one in five attempted telephone calls reaches the wrong number = 0.02475

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

P(x>0) = 0.6 , 60% chance of success

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

Ans. Most likely monetary outcome of the business venture is $2000 as it has maximum probability = 0.3

Expected value = 800

Long term average earning of business ventures = $800

Venture is likely to be successful as expected value is +ve = $800

Good measure of risk is the sd

E(x^2) = 3800000

V(x) = 2160000

Sd(x) = 1469.69.