**Topics: Descriptive Statistics and Probability**

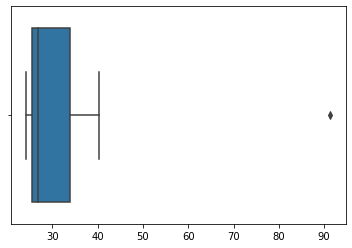
1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| **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 :** Mean = 33.2713

Standard Deviation = 16.9454

Variance = 287.1466





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 :** IQR = 12-5 = 7 , this represents the range which contains 50% of the data points.

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

**Ans :** Right 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?

**Ans :** 2.5 will be not considered an outlier. The boxplot will start from 0 and send at 20 in representation.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans :** Mode lies between 4 and 8

1. Comment on the skewness of the dataset.

**Ans :** Dataset is 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 :** Median in boxplot and mode in histogram provides the frequency distribution so we can see how many times each data point is occurring however boxplot provides whisker length to identify outliers, no information from histogram. We can only guess looking at the gap that 25 may be an 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.)

**Ans :** one in 200 long-distance telephone call 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) = ⁿCₓpˣqⁿ⁻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**

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 :** 2000

1. Is the venture likely to be successful? Explain

**Ans :** Venture likely to be successful venture is successful if X is +ve

Hence if X is 1000,2000 or 3000 probability is

0.2+0.3+0.1 = 0.6 as 0.6> 0.5

Hence venture likely to be successful.

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

**Ans :** Weighted average = x\*p(x) = 800. This means the average expected earnings over a long period of time would be 800 (including all losses and gains over the period of time)

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

**Ans :** Risk stems from the possible variability in the expected returns. Therefore, a good measure to evaluate the risk for a venture of this kind would be variance or standard deviation of the variable X.

Standard Deviation = 1870.829

Variance = 3500000

The large value of standard deviation of $1870 is considered along with the average returns of $800 indicates that this venture is highly risky.