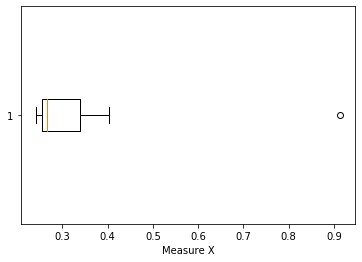
**Topics: Descriptive Statistics and Probability**

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:** Boxplot



Mean (µ) : 0.332713

Variance (σ) : 0.028715

Standard Deviation (σ2) : 0.169454



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:** Inter-quartile range is the difference between upper(Q3) and lower(Q1) quartiles.

IQR = Q3 – Q1 = 12 – 5 = 7

50% of the data lies between IQR.

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

**Ans:** From the above boxplot, we can say that the distribution of X is positively 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:** If it was found that the data point with the value 25 is actually 2.5, there won’t be any outlier in the boxplot. Shifting of median depends on the size of the data. It will also, reduce skewness of the data.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans:** As many values are in between 4 & 10, mode might lie in between. Need actual data for calculating mode.

1. Comment on the skewness of the dataset.

**Ans:** Data 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.

**Ans:** Both the graphs are showing 25 as outlier. Data in both the graphs are positively skewed.

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:** Let’s assume misdirected call as an event(event E). There is a probability of 1 in 200 calls is misdirected.

Probability of occurring event E is 1/200 i.e. P(E) = 1 /200

Then, probability of having at least one successful call will be,

P() = 1 – P(E) = 1 – 1/200 = 199/200

Probability that at least one in 5 attempted call reaches the wrong number

= 1 – (199/200 \* 199/200 \* 199/200 \* 199/200 \* 199/200)

= 1 – (199/200)5

= 1 – 0.97525

= 0.02475

= 2.5%

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:** Most likely monetary outcome of the business venture is return of $2,000, as it has the highest probability.

1. Is the venture likely to be successful? Explain

**Ans:** Best on the given data, there is higher possibility of venture to be successful. There is a 60% probability that the venture will be successful.(0.2 + 0.3 + 0.1 = 0.6 i.e. 60%)

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

**Ans:** The long-term average earning of business ventures of this kind will be $800.

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

**= -**200 -100 + 0 + 200 + 600 + 300

**= -**300 + 1100

= 800

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 of the risk involved in a venture of this kind would be variance or standard deviation of variable x.

Variance(X) = 1870.82869

Standard Deviation = 3500000

By comparing standard deviation of $ 1870 with average returns of $800, we can say that this venture is highly risky.

