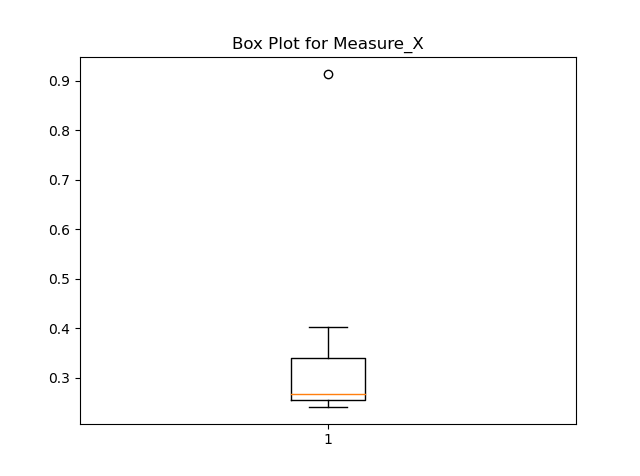
**Topics: Descriptive Statistics and Probability**

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% |
|  |  |
|  |  |



Outlier = Morgon Stanley (91.36%)

Mean = 0.3327133333333333

Variance = 0.026800350488888885

Standard Deviation = 0.16370812590976933

2.



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:

* The inter-quartile range lies between 5 and 12. (IQR = 12-5= 7)
* The inter-quartile range indicates that 50% of the data lies between that.

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

* The dataset 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?

* The Dataset will be normally distributed.

3.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

* The mode of the dataset will be 5.

1. Comment on the skewness of the dataset.

* 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.

* The dataset will be positively skewed
* IQR will be 7
* Data point ‘25’ is 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 wrong number out of 200 Probability of wrong number: P(WN) = 1/200 = 0.005
* Probability of not wrong number: 1 - P(WN) =1- 1/200 = 0.995
* Probability of at least one out of five is a wrong number= 1 – Probability that all five calls are not wrong numbers= 1 – (1 – P(WN))^5= 1 – (1- 0.005)^5= 1 – 0.975= 0.024= 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?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

Ans:

1. (𝑋) = ∑ 𝑋𝑖∗ 𝑃(𝑋𝑖)6𝑖=1= −$2000 ∗ 0.10 − $1000 ∗ 0.10 + 0 + $1000 ∗ 0.20 + $2000 ∗ 0.30+ $3000 ∗ 0.10 = $800
2. If the venture can maintain for long term business then eventually it will be successful since the probability of non-negative return is higher than 0.50 and the expected value for return is a positive number ($800)
3. Calculate the probability the business return is a non-negative number 𝑃(𝑋 ≥ 0) = 𝑃(0) + 𝑃($1000) + 𝑃($2000) + 𝑃($3000) = 0.20 + 0.20 + 0.30 + 0.10= 0.80
4. Calculate the probability the business return is larger than $600 𝑃(𝑋 > $600) = 𝑃($1000) + 𝑃($2000) + 𝑃($3000) = 0.20 + 0.30 + 0.10 = 0.60
5. Calculate the probability the business return is between -$1400 and $2200 𝑃(−$1400 < 𝑋 < $2200) = 𝑃(−$1000) + 𝑃(0) + 𝑃($1000) + 𝑃($2000)= 0.10 + 0.20 + 0.20 + 0.30 = 0.80