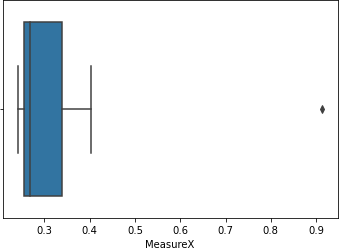
**Topics: Descriptive Statistics and Probability**

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% |

**A:**



𝒎𝒆𝒂𝒏 − 𝝁= 0.33 ,standard deviation - 𝝈 = 0.169 , variance - 𝝈𝟐 = 0.028 , Outlier is Morgan Stanley=91.36%



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.

**A:** Upper limit Q3= 12.5, Lower Quartile Q1= 5, hence IQR = Q3-Q1= 7.5, implying that the maximum data density is 7.5 between 5 and 12.5.

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

**A:** The data is skewed to the right, which is a positive skewness.

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?

**A:** If we discover that the 25 was actually 2.5, which was previously an outlier causing the data to be right skewed, the data will be normally distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**A:** The mode of the dataset would be between 4.5 and -10.

1. Comment on the skewness of the dataset.

**A:**The data is rightly skewed which shows positive skewness.

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.

**A:** We can't observe the mode or frequency of data distribution in Boxplot, which Histogram does extremely well, but Boxplot does explain the Max Density of Data in Inter - Quartile Range pretty well, and Boxplot is ideal for finding outliers, which will help us understand data better.

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.)

**A:** One out of every 200 long-distance phone calls gets misdirected.

=> The probability of a call being misdirected is p = 1/200. Probability of no call 199/2 = 1 - 1/200 = Misdirecting

The likelihood that at least one out of every five attempted calls will reach the incorrect number

= 1 - The likelihood that no attempted call reaches the incorrect number.

=1-(199/200)\*\*5

=1-(0.995)\*\*5

=1-0.975

=0.025, implying that 1 in every 5 attempted phone calls reaches the incorrect number.

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?

**A:** The most likely monetary consequence of the firm is 2000 dollars because its probability is 0.3, which is greater than the other probabilities.

1. Is the venture likely to be successful? Explain

**A:** Yes, the initiative is likely to succeed because the sum of the probability of positive (profit) dollars is 0.2+0.3+0.1=0.6, which equals 1000$+2000$+3000$.

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

**A:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X** | **P(X)** | **E(X)= X . P(X)** | **X²** | **E(X²) = X² . P(X)** |
| -2000 | 0.1 | -200 | 400000 | 40000 |
| -1000 | 0.1 | -100 | 100000 | 10000 |
| 0 | 0.2 | 0 | 0 | 0 |
| 1000 | 0.2 | 200 | 200000 | 40000 |
| 2000 | 0.3 | 600 | 1200000 | 360000 |
| 3000 | 0.1 | 300 | 900000 | 90000 |
| Sum= | 1.0 | 800 | 2800000 | 360000 |

Long term earning of business is E[X]

E[X]=sum of X.P(X)=$ 800

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

**A:** The risk associated with a venture is (X) Variance = E(X2) - (E(X))²

= 360000 - 800²

= -280000 (-ve value which indicates low risk) $ -529 Standard Deviation = sqrt Variance

Even if we look at the facts, the risk is modest because the possibility of profit is greater than zero.$ is 0.8, indicating that if the business initiative fails, there is only a 0.2 chance of losing money.