**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% |
| JPMorgan & 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** The **Outlie**r is **Morgan Stanley**

The **mean of the measure X values is 33.27**, the **standard deviation is 22.06**, and the **variance is 486.40.**

|  |  |  |
| --- | --- | --- |
| Mean (μ) | **33.27133333333333** | |
| Variance(σ^2) | **287.1466123809524** | |
| Standard Deviation(σ) | **16.945400921222028** | |
| Outlier | **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.

**The First-Quartile Range (Q1) = 5**

**The Third-Quartile Range (Q3) = 12**

**The Second-Quartile Range(Q2) or Inter-Quartile Range (IQR) = Q3 – Q1 = 12 – 5 = 7**

**Inter-Quartile Range (IQR) is the Median Value**

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

**The Data is Positively Skewed. The Tail is towards right side of the plot and the median is at the left. 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?

**The Median Value remains same, whereas the IQR may change. Mainly the outlier will be not will be not present and its will be Normally Distributed.**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**ANS The Mode of the dataset are between 5 to 10, approximately lies between 4 to 8. The**

**mode is the data value that occurs the most in a dataset.**

1. Comment on the skewness of the dataset.

**ANS** **The dataset is Right Skewed, as the dataset lies on the right. which is**

**Mean>Median>Mode.**

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 Right Skewed, and outliers are identified in both the graph. Box**

**Plot median visualized easily where as in histogram Mode is Visualized easily**

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** **IF 1 in 200 long-distance telephone calls are getting misdirected.**

**probability of call misdirecting (p) = 1/200**

**Probability of call not Misdirecting (q) = 1-(1/200) = 199/200**

**The probability for at least one in five attempted telephone calls reaches the wrong number**

**Number of Calls (n) = 5**

**P(x) = at least one in five attempted telephone calls reaches the wrong number**

**P(x) = (nCx) (p^x) (q^n-x)**

**P (1) = (5C1) (1/200) ^1 (199/200) ^5-1**

**P (1) = 0.0245037**

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

**0.0245037**

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 **The most likely monetary outcome of the business venture is $ 2000, As for $ 2000 the**

**probability is 0.3 which is maximum as compared as to others**

1. Is the venture likely to be successful? Explain

ANS **Yes, the Probability that the venture will make more than 0 or a profit**

**P(X>0) +P(X>1000) +P(X>2000) +P(X>3000) = 0.2+0.2+0.3+0.1 = 0.8**

**The States that there is an 80 % chance for the venture to make a profit**

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

ANS **The Long-term average earning of Business venture is Expected value**

**E (X) = Sum X \* P (X) = 800, Which means on an average the return will be $ 800.**

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

ANS **The good measure of the risk involved in a venture depend on Variability in the**

**distribution, Higher the variance means more chances of risk**

**Var (X) = E(X^2) – (E(X)) ^2**

**= 2800000 – 800^2**

**= 2160000**