**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% |



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 = **Approximately (First Quantile Range) Q1 = 5 (Third Quantile Range) Q3 = 12, Median (Second Quartile Range) = 7 (Inter-Quartile Range) IQR = Q3 – Q1 = 12 – 5 = 7 Second Quartile Range is the Median Value**

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

ANS = **Right- Skewed median is towards the left side is not normal distribution**

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 = **In that case there would be one Outliera on the given data set because of the outlier the data had positive skewness it will reduce and the data will normal distributed**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

ANS =

1. Comment on the skewness of the dataset.

ANS = **Right- Skewed . 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 = **They both are Right-Skewed and both have outliers the median can be easily visualized in box plot where as in histogram mode is more visible**

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 = 1/200 Probability of call not Misdirecting = 1-1/200 = 199/200 The probability for at least one in five attempted telephone calls reaches the wrong number Number of Calls = 5 n = 5 p = 1/200 q = 199/200 P(x) = at least one in five attempted telephone calls reaches the wrong number P(x) = ⁿCₓ pˣ qⁿ⁻ˣ P(x) = (nCx) (p^x) (q^n-x) # nCr = n! / r! \* (n - r)! P(1) = (5C1) (1/200)^1 (199/200)^5-1 P(1) = 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 |
|  |  |

**ANS = x P(x) -2,000 0.1 -1,000 0.1 0 0.2 1000 0.2 2000 0.3 3000 0.1 E(X) =Sum X.P(X) | E(X^2) =X^2P(X) -200 | 400000 -100 | 100000 0 | 0 200 | 200000**

**600 | 1200000 300 | 900000 Total: 800 | 2800000**

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 to others**

1. Is the venture likely to be successful? Explain

ANS =  **Venture is successful if X is +ve**

**If X is 1000 ,2000 or 3000**

**Probability is 0.2+0.+0.1=0.6**

**As 0.6>0.5 Hense Venture likely to be sucessful**

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

ANS = **The long-term average is Expected value = Sum (X \* P(X)) = 800$ which means on an average the returns will be + 800$**

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

ANS =  **Risk involved in a venture**

**Var (X) = E(X²)  - { E(X) }²**

**=   2800000 -   800²**

= **2160000  ( Quite High)**

**SD = √Var  ≈ $ 1470**

**As Variability is Quite high  hence Risk is high**