**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% |
|  |  |





**The following is the outlier in the boxplot: Morgan Stanley 91.36%**

**measure\_x.describe()**

**Mean = 33.271333**

**Standard deviation = 16.945401**

**measure\_x.var()**

**Variance = 287.1466123809524**



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) skewness is positive**

1. If it was found that the data point with the value 25 is actually 2.5, how would the new boxplot be affected?

**Ans)In that case there would be no Outliers on the given dataset**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans) The mode of this data set lie in between approximately between 6 to 8 .**

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:**

**Probability that at least one in 5 attempted call reaches the wrong number is 0.025**

**Explanation:**

**Let us define an event**

**E: The call is misdirected**

**then probability of the event E is**



**Therefore,**



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

**= 1 - Probability that no attempted call reaches the wrong 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 |

E(X) =Sum X.\*P(X) | E(X^2) =X^2\*P(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) 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 this states that there is a good 80% chances for this venture to be making a profit**

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) The good measure of the risk involved in a venture of this kind depends on the Variability in the distribution. Higher Variance means more chances of risk**

**Var (X) = E(X^2) –(E(X))^2**

**= 2800000 – 800^2**

**= 2160000**