**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

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| --- | --- |
| **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% |

Sol: Morgan Stanley is an outlier of 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.

Sol: Approximate first Quartile range Q1= 5 Third Quartile range Q3= 12 Median(Second Quartile range=7 with 1 upper outlier.

Inter Quartile Range (IQR)= Q3-Q1

12-5=7

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

Sol: Right-Skewed median is towards the left side it 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?

Sol: In that case there would be no Outliers on the given dataset because of the outlier the data had positive skewness it will reduce and the data will normal distributed

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Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Sol: The mode of data set lie between 5 to 10.

1. Comment on the skewness of the dataset.

Sol: Right 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.

Sol: 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.

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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.)

1/200 . 0.025

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

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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?

Sol: The most likely monetary outcome of the business venture : x=2000 with the highest probability of 0.3

1. Is the venture likely to be successful? Explain

Sol: The venture is likely to be successful because (x=1000)+(x=2000)+P(x=3000)

0.2+0.3+0.1=0.6 as 0.6>0.5 Hence **venture likely to be successful**

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

Sol: =(0.1)(-2000)+(0.1)(-1000)+(0.2)(0)+(0.2)(1000)+(0.3)(2000)+(0.1)(3000)=$800

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

Sol: Risk involve in a ventures Var (X) = E(X²)  - { E(X) }²

=2800000-800^2

= 2160000

SD = √Var  ≈ $ 1470

As Variability is Quite high  hence Risk is high