**Topics: Descriptive Statistics and Probability**

Q2



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.

Answer: - IQR = Q3-Q1

= 12-5=7

IQR = 7

This value implies the amount of spread of the data within the distribution.

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

Ans: - The distribution of dataset is positively 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?

Ans: - If the value of 25 is 2.5 then there will be no Outliers in the distribution and as

skewness is due the outliers after vanishing the outlier the distribution will be normal.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: - Mode define occurrence of datapoints. Hence the mode of the dataset lies between 5-10.

1. Comment on the skewness of the dataset.

Ans: - The distribution is positively skewed due the outliers.

1. Suppose that the above histogram and the boxplot 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 distribution will have outliers and positively skewed. And boxplot will represent the Median and Histogram represent the Mode of datasets.

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: - Given data: -

Misdirected calls = 1

Correctly directed calls = 200-1=199

P (Misdirected calls) = 1/200 = 0.005

P (correctly directed calls) = 199/200 = 0.995

probability that at least one in five attempted telephone calls = 5C1 × (0.005) × (0.995) ^4

= 5 × 0.005×0.98

= 0.0245

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 outcome which has greater probability will have most likely monetary outcome i.e., $2000 with p(x)=0.3.

1. Is the venture likely to be successful? Explain

Ans: - Venture will be successful when there is profit. Hence if we calculate the probability of returns, we have P (Return or Profit) = P (1000) +P (2000) + P (3000) =0.2+0.3+0.1=0.6

P (Profit return) = 0.6

It will give 60% chance of profitable returns. And hence it is successful.

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

Ans: - Long term average earning will be = ∑(P(X)× X)

= (-2000) ×0.1+(-1000) ×0.1+0×0.2+1000×0.2+2000×0.3+3000×0.1

= $800

Hence the average earning for venture will be $800.

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

Ans: - Good measure of the risk involved in a venture of this kind is variability in distribution.

Var = E(X^2) – {E(X)} ^2 = 2800000-800^2 = 2160000

SD = sqrt(var) = $1470

As Variability is Quite high hence Risk is high.