# Topics: Descriptive Statistics and Probability

1. Look at the data given below. Plot the data, find the outliers and find out μ, σ, σ^2

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%

➔ From Boxplot-----> Morgan Stanley = 91.36% is outlier
➔ Mean = 33.27
➔ Std = 16.94
➔ Var = 287.14

2.

Box-Plot of variable 'X'
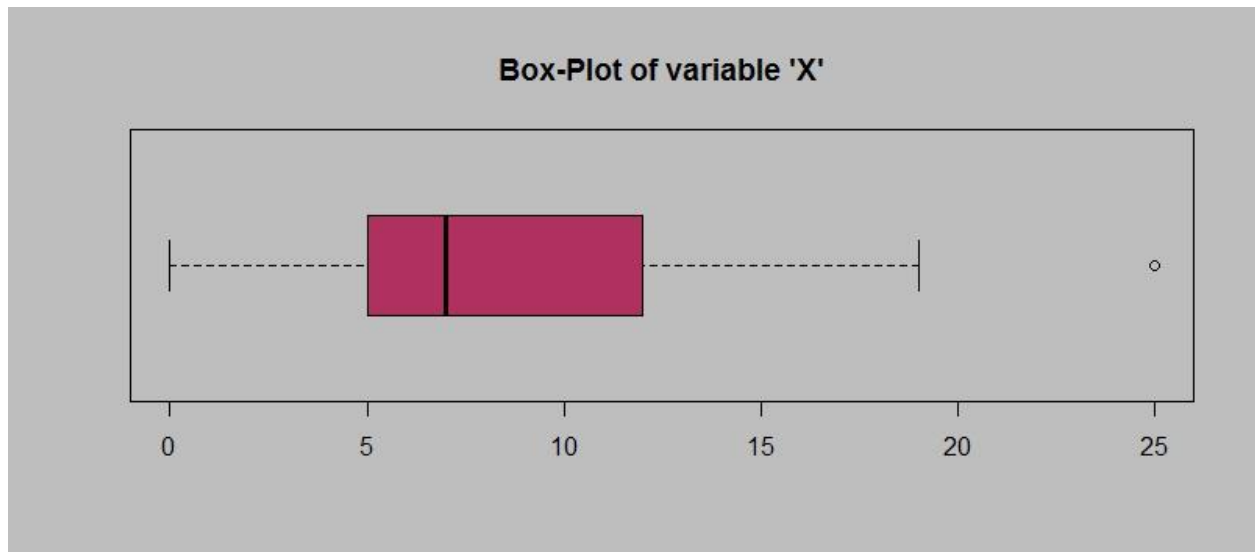
Answer the following three questions based on the box-plot above.

(i) What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.
➔ Q3 = 12, Q1 = 5, IQR = Q3 − Q1 => 12 − 5 = 7

(ii) What can we say about the skewness of this dataset?
➔ As the box plot lies towards the left, we can say that it is positively skewed

(iii) If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?
➔ There won't be significant difference in the boxplot. There won't be any outlier in the plot.

3.

Histogram of variable 'Y'
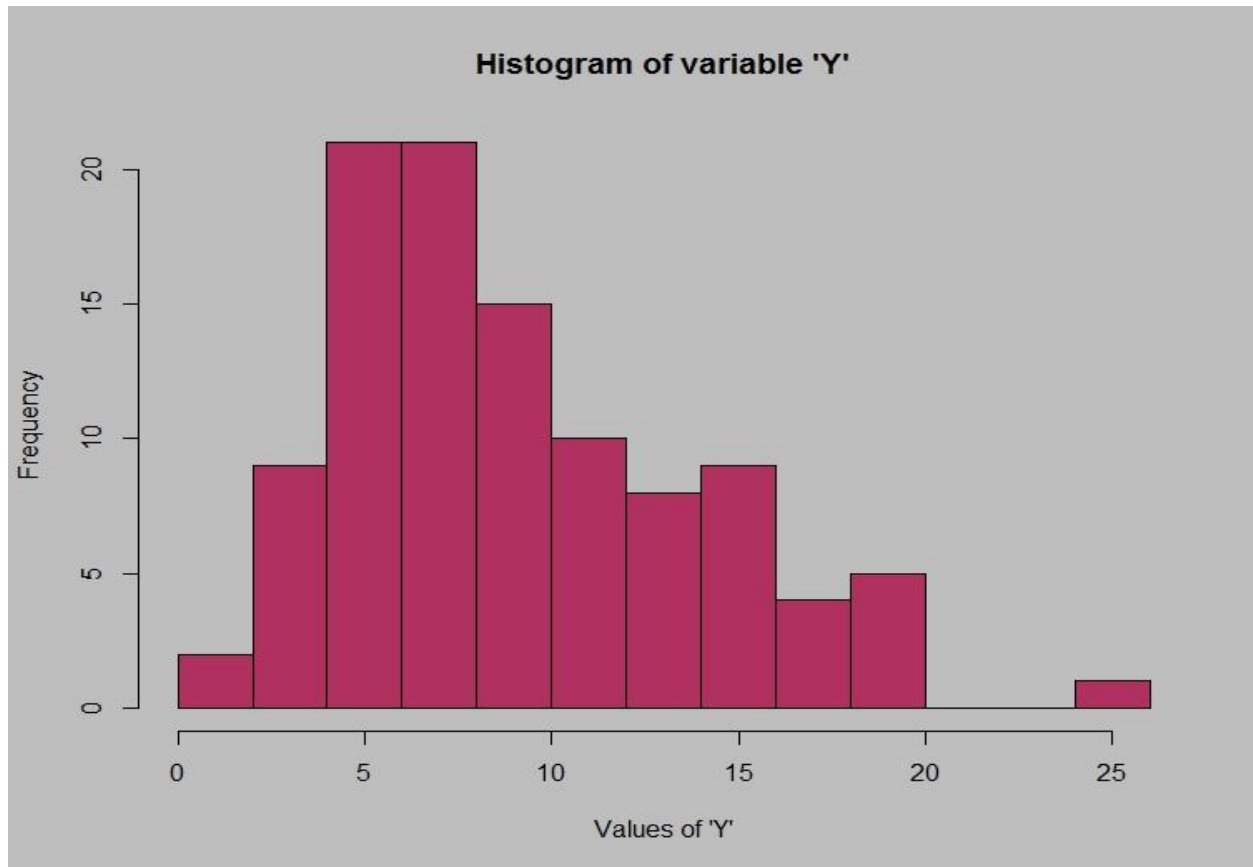
Answer the following three questions based on the histogram above.
(i)   Where would the mode of this dataset lie?
        ➔ Between 4 - 8
(ii)   Comment on the skewness of the dataset.
        ➔ It is positively skewed
(iii)   Suppose that the above histogram and the box-plot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.
        ➔ In both the graphs, there is a positive skewness of the data.
        ➔ According to the boxplot the mean is 7
        ➔ Both the plots have an outlier as 25

4. 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.)

   → Probability of misdirected = 1/200=0.005
   → Probability of not misdirected = 1-1/200=0.995
   → Probability of atleast one out of 5 number

      = 1- Probability of all 5 numbers are not misdirected

      = 1- [(1-.005)power5]

      = 1-[(1-.005) (1-.005) (1-.005) (1-.005) (1-.005)]

      = 1-0.9752

      = .02475

      =2.475

      =2.5%

5. 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

   (i)   What is the most likely monetary outcome of the business venture?
         → Most likely monetary outcome will be 2000 with probability of 0.3
   (ii) Is the venture likely to be successful? Explain
         → Yes , Because probability of profit is higher than the loss
   (iii) What is the long-term average earning of business ventures of this kind? Explain
         → Long term avg = x * P(x) = 800
   (iv) What is the good measure of the risk involved in a venture of this kind? Compute this measure
         → Probability of risk = (-2000*.1) + (-1000*.1) = 0.2 = 20% risk