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

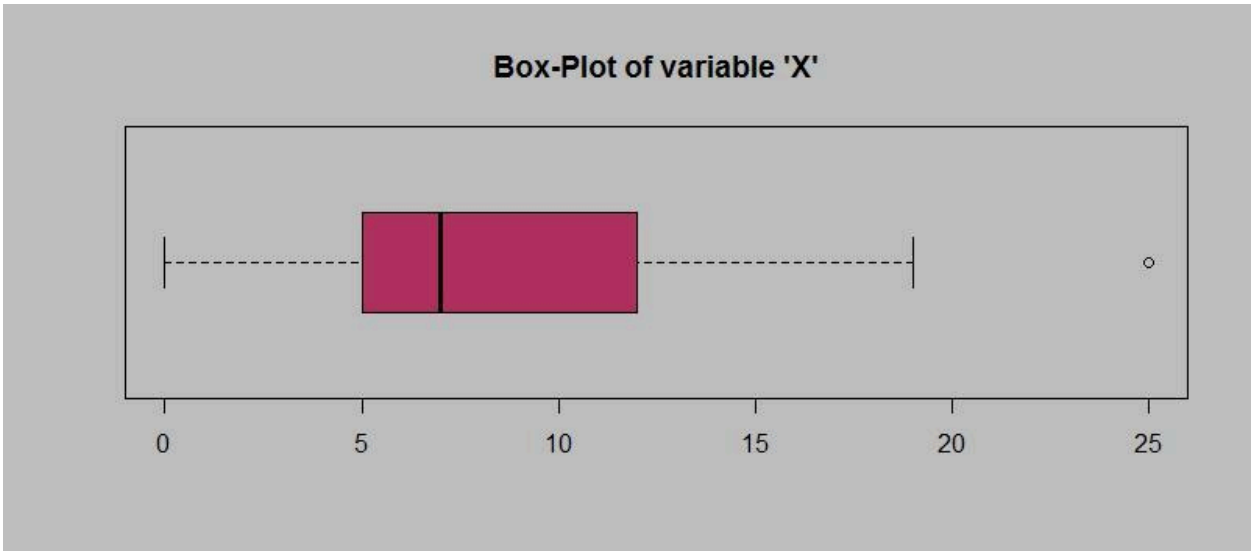
Name of company	Measure X
Allied Signal	24.23%
Bankers Trust	25.53%
General Mills	25.41%
ITT Industries	24.14%
J.P.Morgan & Co.	29.62%
Lehman Brothers	28.25%
Marriott	25.81%
MCI	24.39%
Merrill Lynch	40.26%
Microsoft	32.95%
Morgan Stanley	91.36%
Sun Microsystems	25.99%
Travelers	39.42%
US Airways	26.71%
Warner-Lambert	35.00%

Ans: 1) Morgan Stanley is the outlier in the given data.

2) Mean 33.271333
Variance 287.146612
Standard Deviation 16.945401

Questions referred to from *Aczel A., Sounderpandian J., Complete Business Statistics (7ed.)*

2.



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.

Ans: The IQR is about 7. IQR gives a spread of the 50% data in the box plot.

(ii) What can we say about the skewness of this dataset?

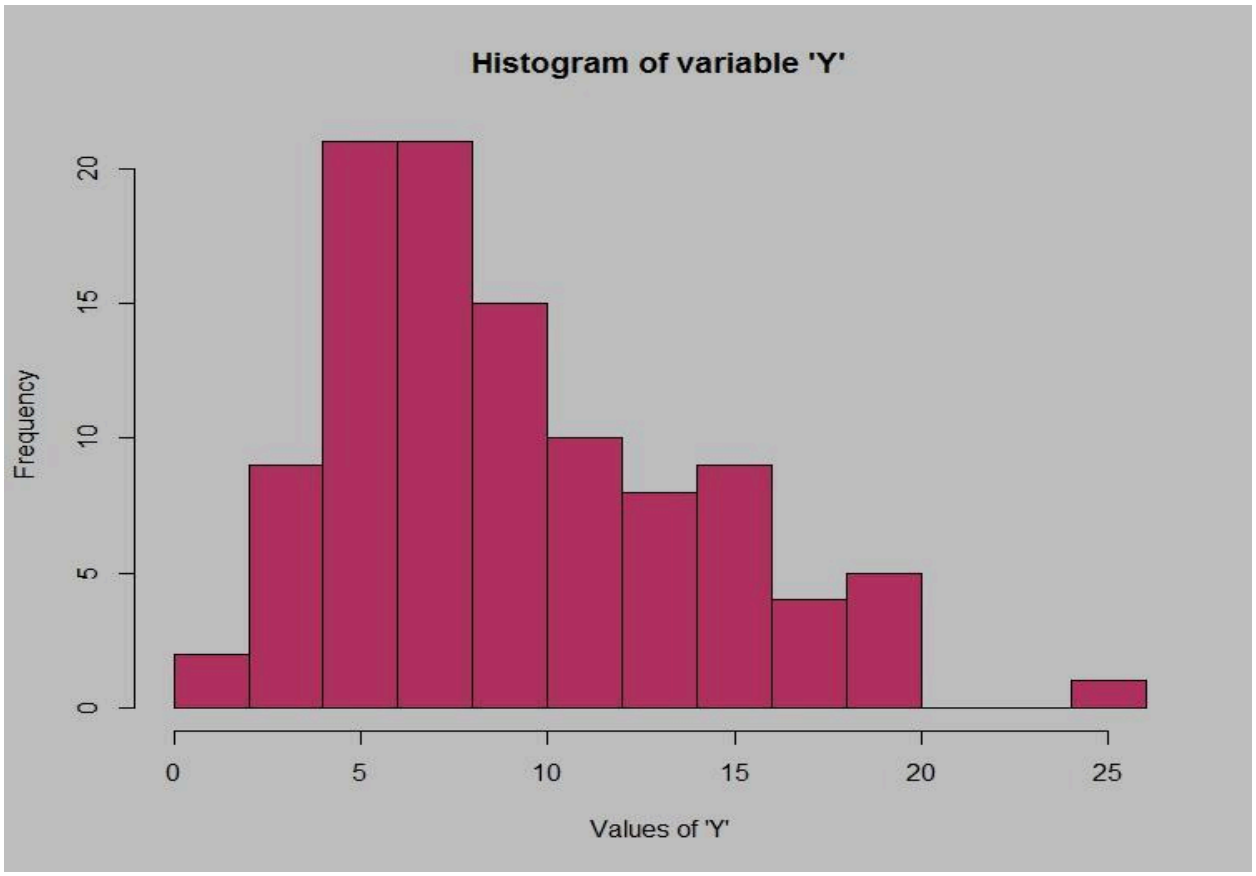
Ans: The Boxplot is positively skewed.

(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?

Ans: 1) There will be no outliers.

2) Median will not change but the IQR will change.

3.



Answer the following three questions based on the histogram above.

(i) Where would the mode of this dataset lie?

Ans: The mode will lie between 4 to 8 approximately.

(ii) Comment on the skewness of the dataset.

Ans: The data is positively skewed i.e left tailed.

(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.

Ans: Both provide outliers. The BoxPlot gives the median clearly and the histogram provides visualization.

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.)**

Ans: p=1/200. q= 1-p= 199/200.

To calculate at least one of five i.e.

1- no calls reach the wrong number

$= 1-P(0)$

$= 1- {}^{5}C_{0}(1/200)^{0}(199/200)^{5-0}$

$= 0.02475.$

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?

Ans: 2000 is the most likely monetary outcome as it has the highest probability of 0.3.

(ii) Is the venture likely to be successful? Explain

Ans: Yes venture is likely to be successful as the profit has the highest probability of about 80%.

(iii) What is the long-term average earning of business ventures of this kind? Explain

Ans: The long-term average investment is about 800$. The total returns x.P(x) is 800$.

(iv) What is a good measure of the risk involved in a venture of this kind? Compute this measure

Ans: The risk involved can be calculated by Variance, if Variance is high risk is also high. So the total variance is 216000. So we can conclude that the high amount risk is involved in this venture.