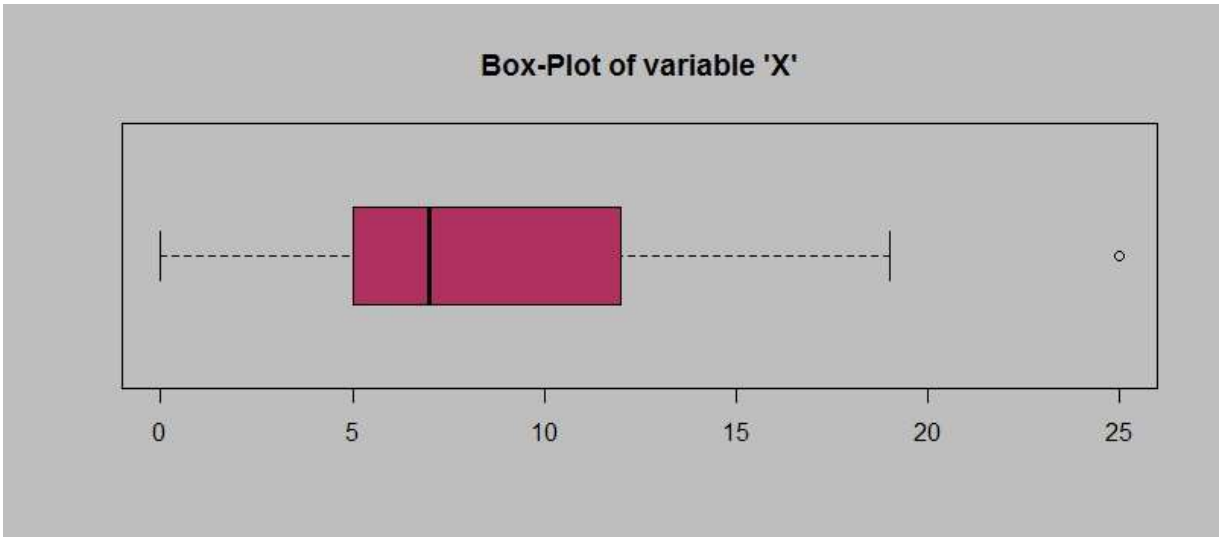
Topics: Descriptive Statistics and Probability

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%

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:Approximately

Q1=5

Q3=12

Q2=7

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

IQR=Q3-Q1=7

IQR is the median value

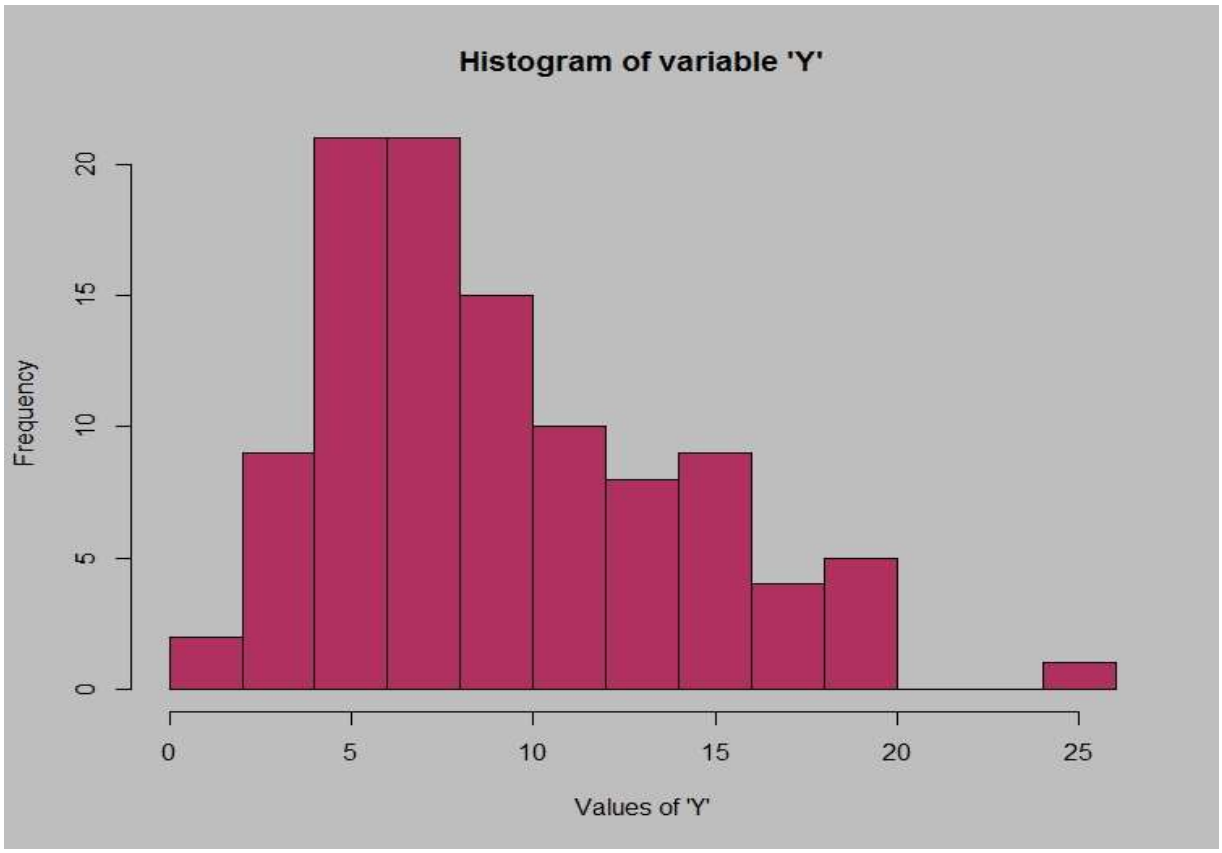
(ii) What can we say about the skewness of this dataset?

Ans: It is positively skewed. Hence we can say the it is Right Skewness

(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: In this case there will be no outliers as the outlier lies on 25. Then it will become normal distribution rather than right skewed distribution.

3.



Answer the following three questions based on the histogram above.

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

Ans:The mode lies between 4 to 8 approximately

(ii) Comment on the skewness of the dataset.

Ans:Right-Skewed; mean>median>mode

(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:They both are right-skewed and both have outliers the median can be easily visualized inbox plot where as in histogram mode is more visible

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

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: 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

   $$P(x) = {}^{n}C_{x}\, p^{x}\, q^{n-x}$$

   P(x) = (nCx) (p^x) (q^n-x)

   nCr = n! / r! * (n - r)!

   P(1) = (5C1) (1/200)^1 (199/200)^5-1P(1) = 0.0245037

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 of the business venture

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

   Ans: income=sum(p(x)*x)

   -200-100+0+200+600+300=800

   Yes, it will be successful as it has positive value in total

   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 isa good 80% chances for this venture to be making a profit

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

   Ans:+800 is the long-term average earning of business ventures of this kind because in summation we are getting a positive value

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

   Good measure of risk is standard deviation

   E(X) = ∑X . P(X)

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

$E(X^2) = \sum X^2 \cdot P(X)$

$Var(X) = E(X^2) - \{ E(X) \}^2$

SD = squareroot(Var)

$Var(X) = E(X^2) - \{ E(X) \}^2$

$= 2800000 - 800^2$

$= 2160000$ (Quite High)

SD = squareroot(Var) ≈ $ 1470

As Variability is Quite high hence Risk is high

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