

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

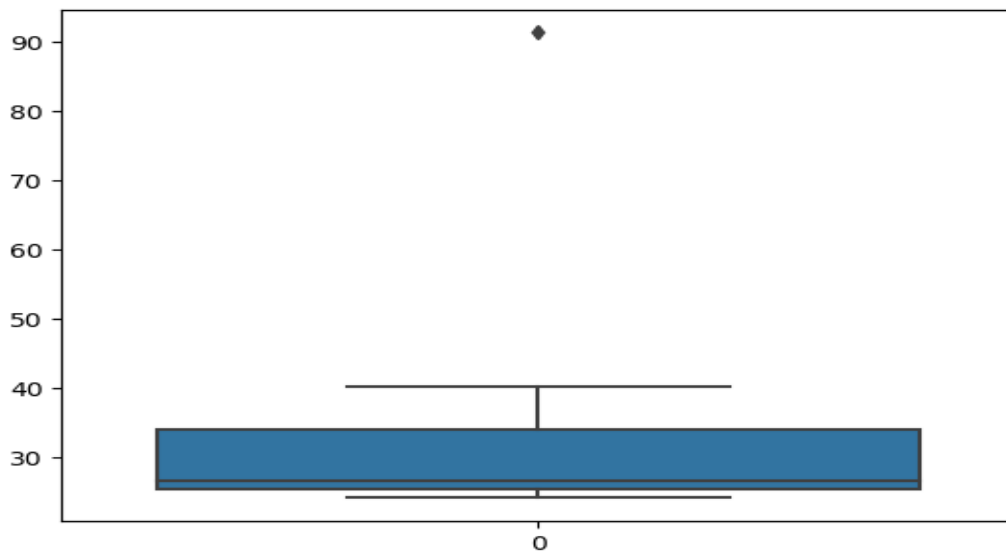
Name of company	Measure X
Allied Signal	24.23%
Bankers Trust	25.53%
General Mills	25.41%
ITT Industries	24.14%
J.P.Morgan & Co.	29.62%
Lehman Brothers	28.25%
Marriott	25.81%
MCI	24.39%
Merrill Lynch	40.26%
Microsoft	32.95%
Morgan Stanley	91.36%
Sun Microsystems	25.99%
Travelers	39.42%
US Airways	26.71%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

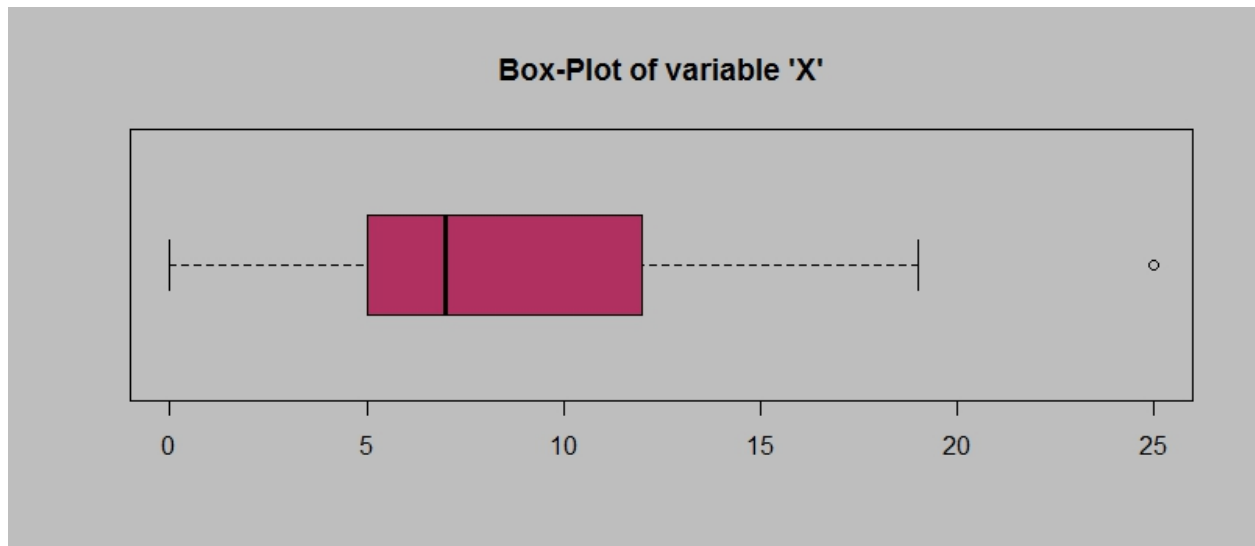
Mean=33.271

Std Deviation-16.945

Vairance-268.0035

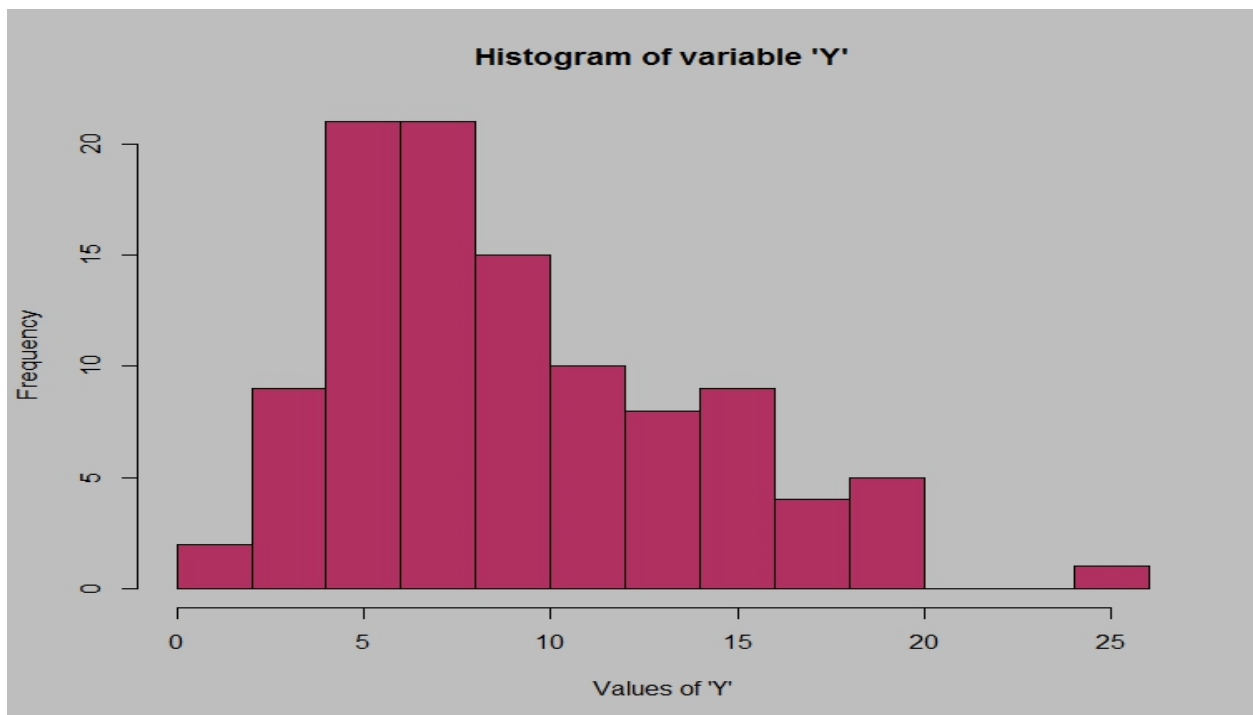
Outlier- Morgon Stanley





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.
Q1-5(First Quartile Range)
Q3-12(Third Quartile Range)
IQR= Q3-Q1=7
- (ii) What can we say about the skewness of this dataset?
Right skew median moves left side it is not normal distribution
- (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?
No outlier has it has positive skewness



Answer the following three questions based on the histogram above.

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

Between 4 to 8

- (ii) Comment on the skewness of the dataset.

Right skew

- (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.

Both are Right side skewed .No Outliers

2. 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.)

Propbality of call Misleading=1/200

Propabilty of call not misleading=1-1/200=199/200

No.of.Calls=5

$$P(x) = {}^nC_x p^x q^{n-x}$$

$$n = 5$$

$$p = 1/200$$

$$q = 199/200$$

at least one in five attempted telephone calls reaches the wrong number

$$= 1 - \text{none of the call reaches the wrong number}$$

$$= 1 - P(0)$$

$$= 1 - {}^5C_0 (1/200)^0 (199/200)^{5-0}$$

$$= 1 - (199/200)^5$$

$$= 0.02475$$

3. 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

X	P(x)	$E(x)=x.P(x)$	$E(x^2)=x^2.P(x^2)$
-2000	0.1	-200	40000
-1000	0.1	-100	10000
0	0.2	0	0
1000	0.2	200	40000
2000	0.3	600	360000
3000	0.1	300	90000
	=	800	540000

- (i) What is the most likely monetary outcome of the business venture?
Most likely monetary outcome = \$2000 and it has max probability of 0.3
- (ii) Is the venture likely to be successful? Explain
 $P(x > 0) + p(x > 1000) + p(x > 2000) + p(x > 3000) = 0.2 + 0.2 + 0.3 + 0.1 = 0.8$
80% chance to be successful
- (iii) What is the long-term average earning of business ventures of this kind? Explain
 $E(x) = x.P(x) = \$800$
- (iv) What is the good measure of the risk involved in a venture of this kind? Compute this measure

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

$$= 540000 - 800^2$$

$$= 216000 \text{ (Quite High)}$$