Q1) Identify the Data type for the Following:

Activity	Data Type
Number of beatings from Wife	Discrete
Results of rolling a dice	Discrete
Weight of a person	Continuous
Weight of Gold	Continuous
Distance between two places	Continuous
Length of a leaf	Continuous
Dog's weight	Continuous
Blue Color	Discrete
Number of kids	Discrete
Number of tickets in Indian railways	Discrete
Number of times married	Discrete
Gender (Male or Female)	Discrete

Q2) Identify the Data types, which were among the following

Nominal, Ordinal, Interval, Ratio.

Data	Data Type
Gender	Nominal
High School Class Ranking	Ordinal
Celsius Temperature	Ratio
Weight	Ratio
Hair Color	Nominal
Socioeconomic Status	Nominal
Fahrenheit Temperature	Ratio
Height	Ratio
Type of living accommodation	Nominal
Level of Agreement	Ordinal
IQ(Intelligence Scale)	Ordinal
Sales Figures	Ratio
Blood Group	Nominal
Time Of Day	Interval
Time on a Clock with Hands	Interval
Number of Children	Nominal
Religious Preference	Nominal

Barometer Pressure	Interval
SAT Scores	Interval
Years of Education	Ratio

Q3) Three Coins are tossed, find the probability that two heads and one tail are obtained?\

ANS:3/8=0.375

Q4) Two Dice are rolled, find the probability that sum is

a) Equal to 1
   Ans:- zero
b) Less than or equal to 4
   Ans:- 1/6
c) Sum is divisible by 2 and 3
   Ans:- 1/6

Q5) A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?
Ans:- 10/21

Q6) Calculate the Expected number of candies for a randomly selected child

Below are the probabilities of count of candies for children (ignoring the nature of the child-Generalized view)

CHILD	Candies count	Probability
A	1	0.015
B	4	0.20
C	3	0.65
D	5	0.005

E	6	0.01
F	2	0.120

Child A – probability of having 1 candy = 0.015.

Child B – probability of having 4 candies = 0.20

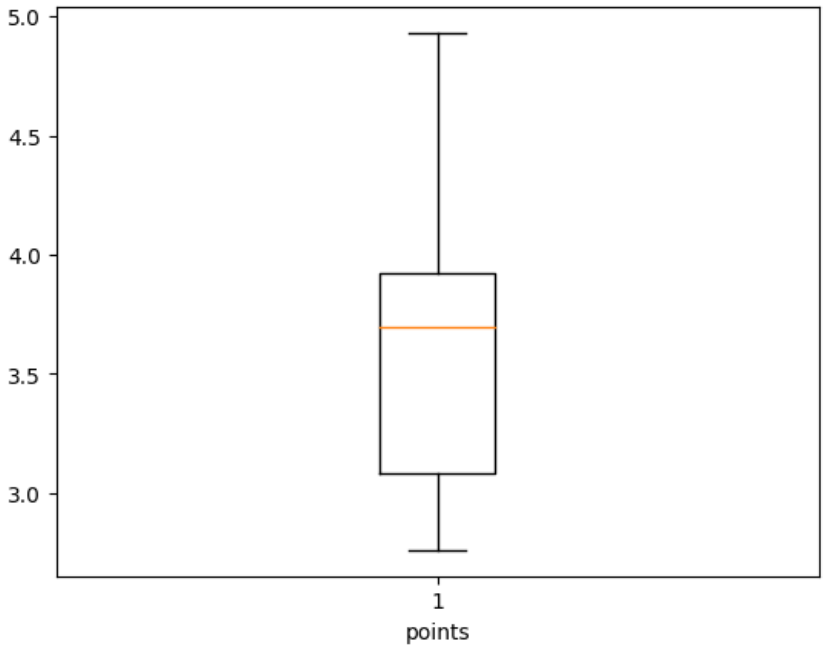
Ans:-3.09

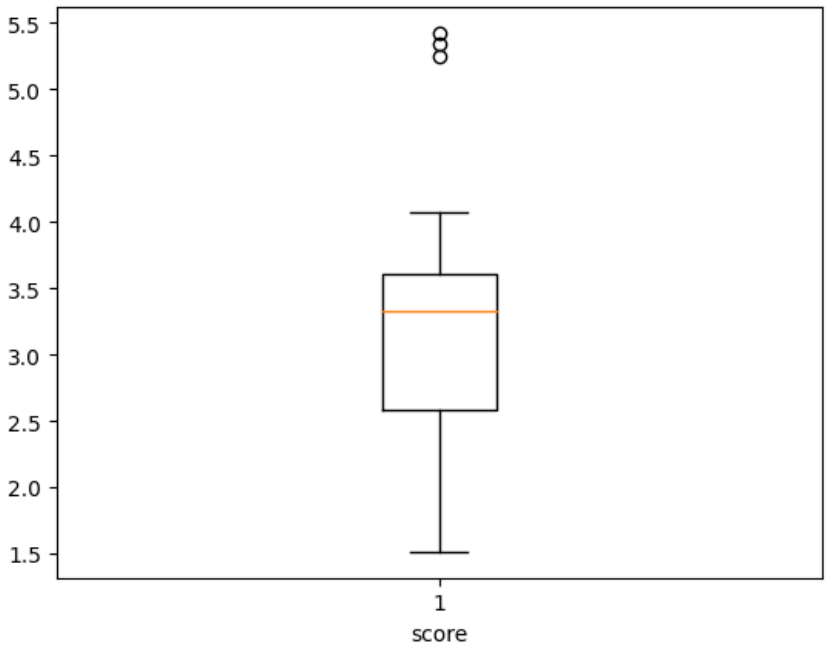
Q7) Calculate Mean, Median, Mode, Variance, Standard Deviation, Range & comment about the values / draw inferences, for the given dataset

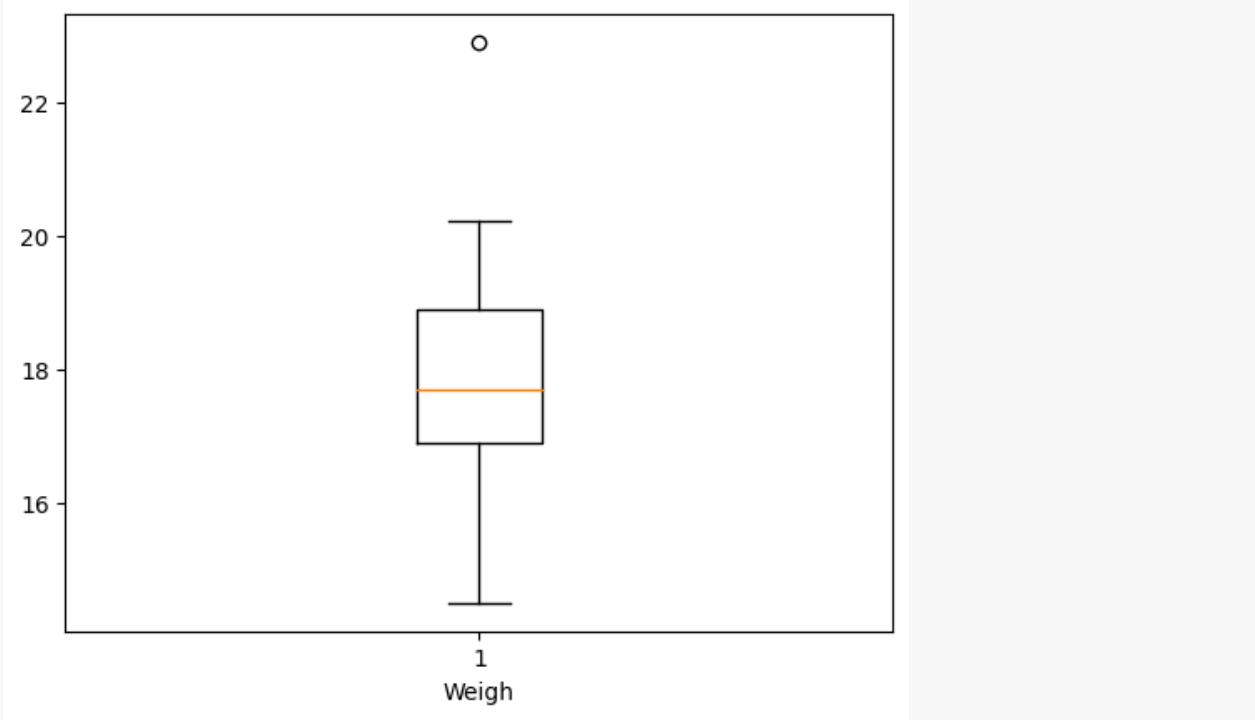
- For Points,Score,Weigh>
  Find Mean, Median, Mode, Variance, Standard Deviation, and Range and also Comment about the values/ Draw some inferences.

Ans:-

	Points	Score	Weigh
Mean -	3.596	3.217	17.848
Median -	3.695	3.325	17.71
Mode -	3.891	3.54	17.43
Standard Deviation -	0.534	0.978	1.786
Variance -	0.285	0.957	3.19
Min, Max -	2.76 , 4.93	1.513,5.424	14.5,22.9
Range -	2.17	3.911	8.399


5.0
4.5
4.0
3.5
3.0
1
points


5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1
score



Use Q7.csv file

Q8) Calculate Expected Value for the problem below

a) The weights (X) of patients at a clinic (in pounds), are
108, 110, 123, 134, 135, 145, 167, 187, 199

Assume one of the patients is chosen at random. What is the Expected Value of the Weight of that patient?

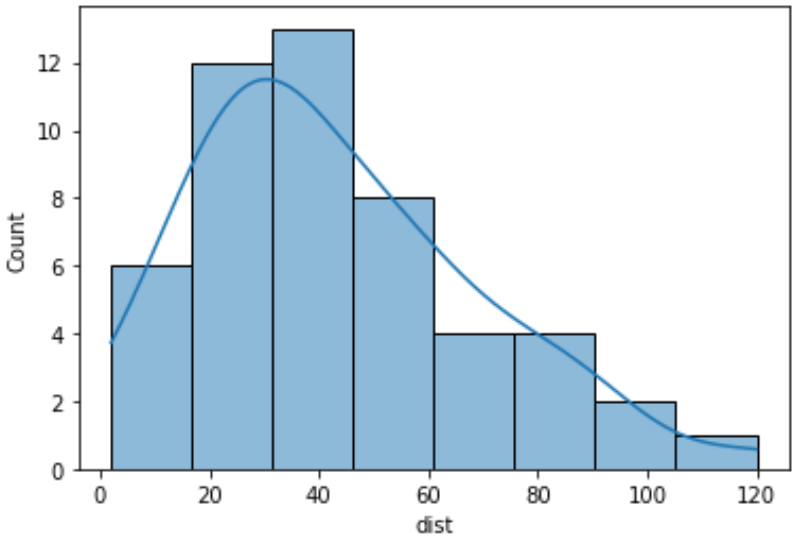
Ans :- 145.33

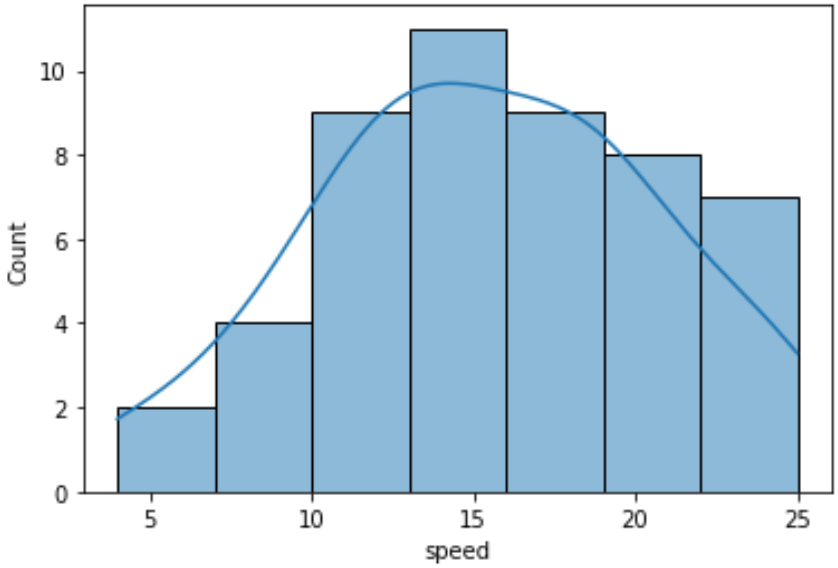
Q9) Calculate Skewness, Kurtosis & draw inferences on the following data

Cars speed and distance

Use Q9_a.csv

ANS:-	Car Speed	Distance
Skewness	-0.11 3	0.782
Kurtosis	-0.508	0.405

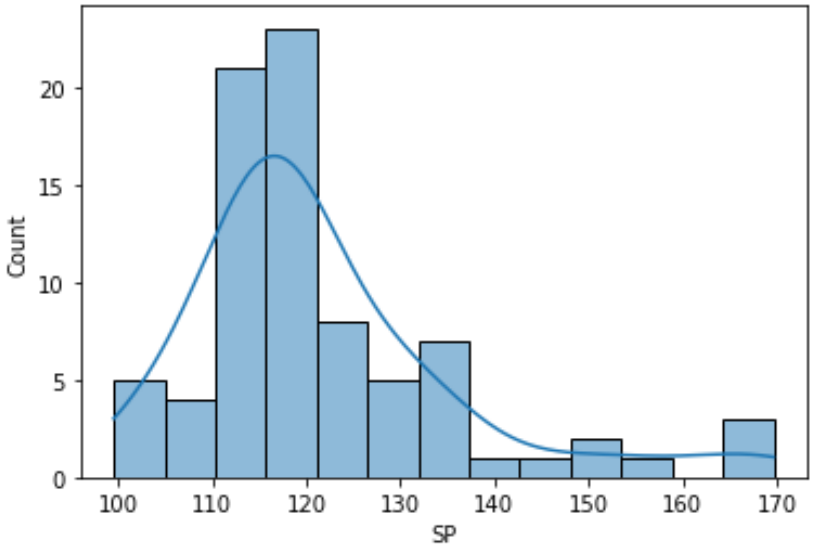


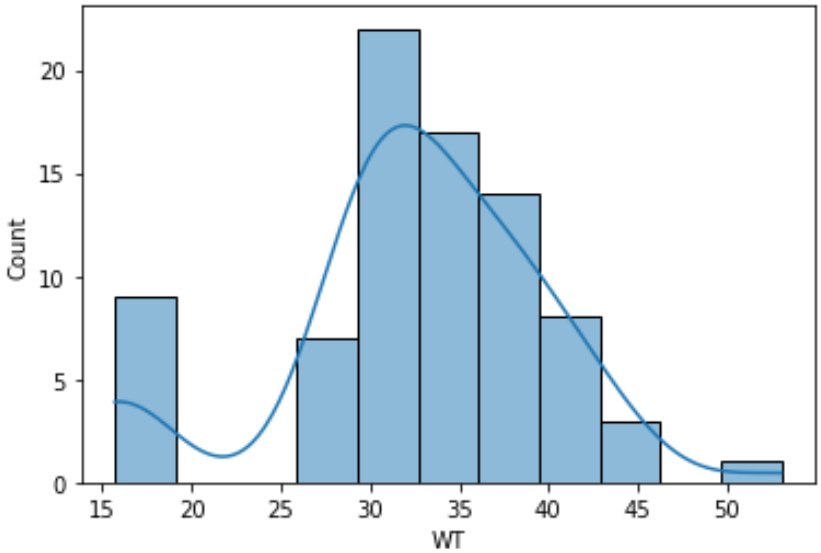


SP and Weight(WT)

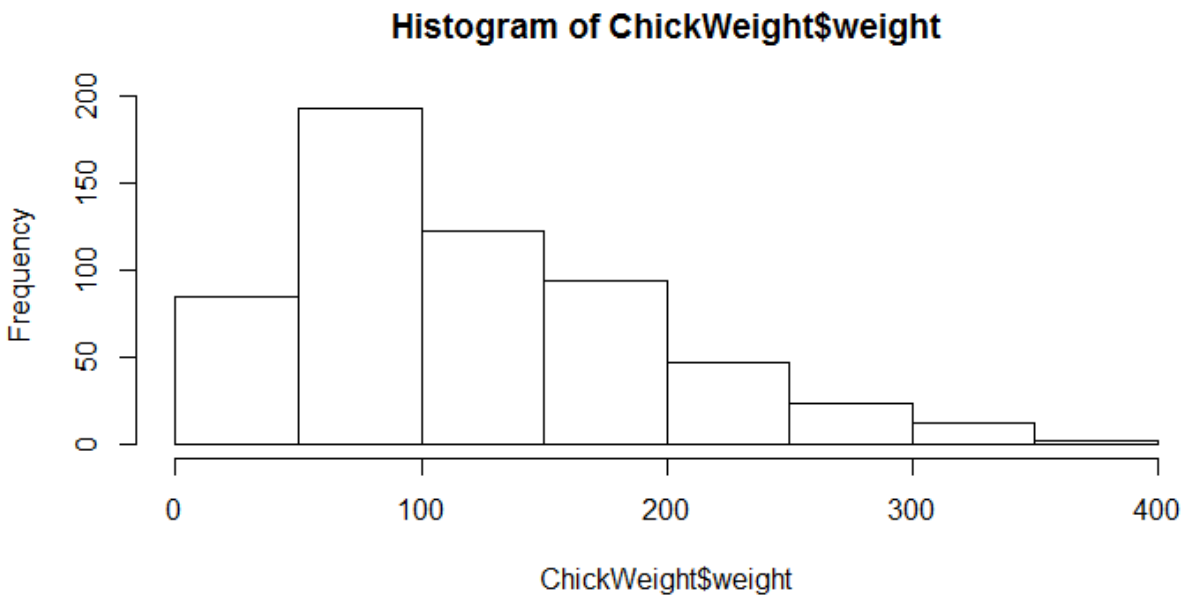
Use Q9_b.csv

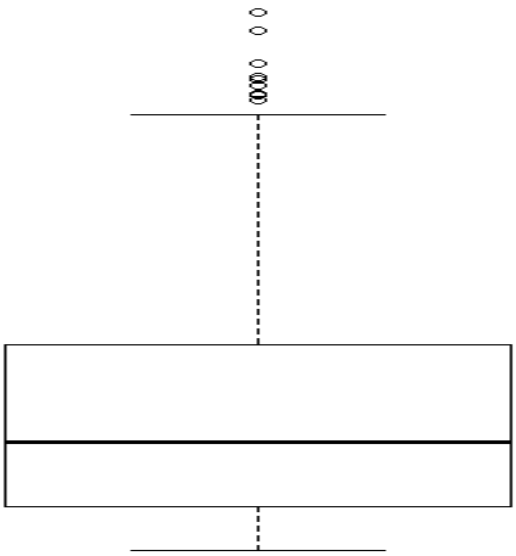
	Sp	**wt**
Skewness -	1.5814	-0.6033
Kurtosis -	2.9773	0.9502





Q10) Draw inferences about the following boxplot & histogram





Ans: The histograms peak has right skew and tail is on right. Mean > Median. We have outliers on the higher side.

Ans: The boxplot has outliers on the maximum side.

Q11) Suppose we want to estimate the average weight of an adult male in Mexico. We draw a random sample of 2,000 men from a population of 3,000,000 men and weigh them. We find that the average person in our sample weighs 200 pounds, and the standard deviation of the sample is 30 pounds. Calculate 94%,98%,96% confidence interval?

Confidence Interval	Z value	Range
Confidence interval94%	201.2616	198.73,201.26
Confidence interval96%	201.5605	198.62,201.38
Confidence interval98%	201.3776	198.43,201.56

Q12) Below are the scores obtained by a student in tests

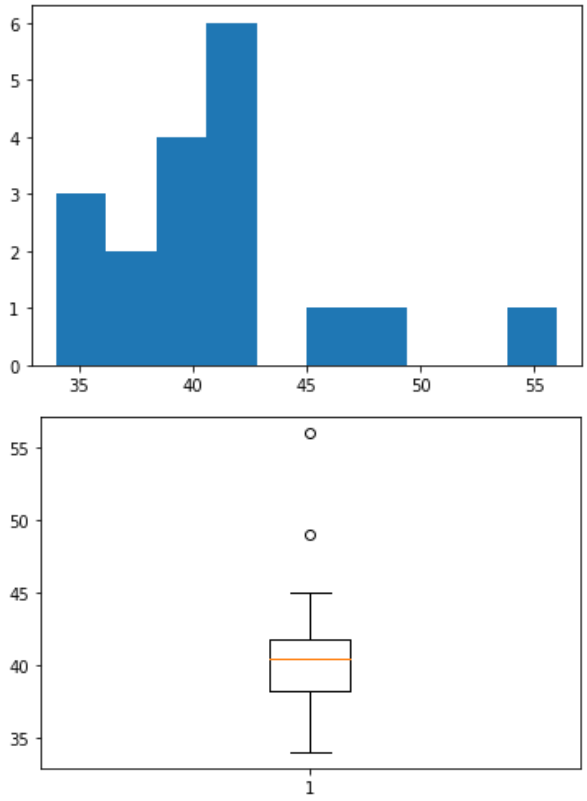
34,36,36,38,38,39,39,40,40,41,41,41,41,42,42,45,49,56

1) Find mean, median, variance, standard deviation.
2) What can we say about the student marks?

Solution=

Mean	41
Median	40.5
Variance	25.52
Standard Deviation	5.05664

Skewness(1.52) is positive because mass of marks in left side of plot.



Q13) What is the nature of skewness when mean, median of data are equal?

Ans- Data is normalized and there is no skewness.

Q14) What is the nature of skewness when mean > median ?

Ans- Negative skewness implies mass of the distribution concentrated on right Side.

Q15) What is the nature of skewness when median > mean?

Ans- Positive skewness implies mass of the distribution concentrated on left side.

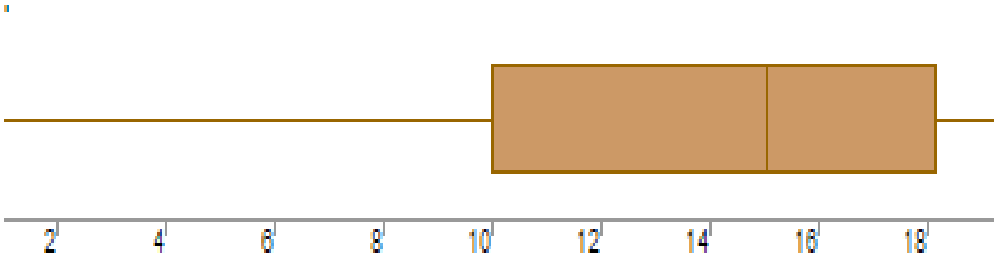
Q16) What does positive kurtosis value indicates for a data ?

Ans- Positive kurtosis value indicates that thinned peak and wider tails.

Q17) What does negative kurtosis value indicates for a data?

Ans- Negative kurtosis value indicates that wider peak and thinner tails.

Q18) Answer the below questions using the below boxplot visualization.



What can we say about the distribution of the data?

Ans:-Not normally distributed

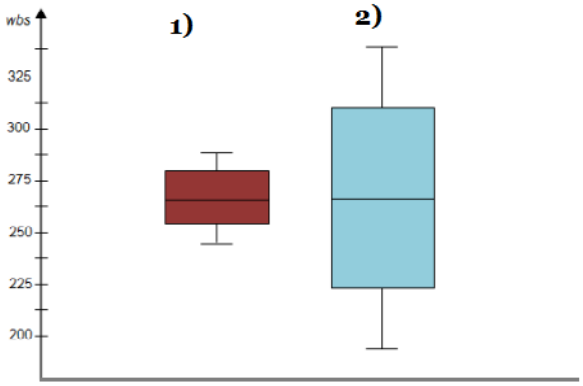
What is nature of skewness of the data?

Ans:- -Negative Skewness

What will be the IQR of the data (approximately)?

Ans:- 10-18

Q19) Comment on the below Boxplot visualizations?



Draw an Inference from the distribution of data for Boxplot 1 with respect Boxplot 2.

Ans:- First there are no outliers. Second both the box plot shares the same median that is approximately in a range between 275 to 250 and they are normally distributed with zero to no skewness neither at the minimum or maximum whisker range.

Q 20) Calculate probability from the given dataset for the below cases

Data _set: Cars.csv

Calculate the probability of MPG of Cars for the below cases.

MPG <- Cars$MPG

a. P(MPG>38)

Ans:-pnorm(38,34.422,9.13144) = 0.3475908

b. P(MPG<40)

Ans:-Pnorm(40,34.422,9.13144) = 0.7293527

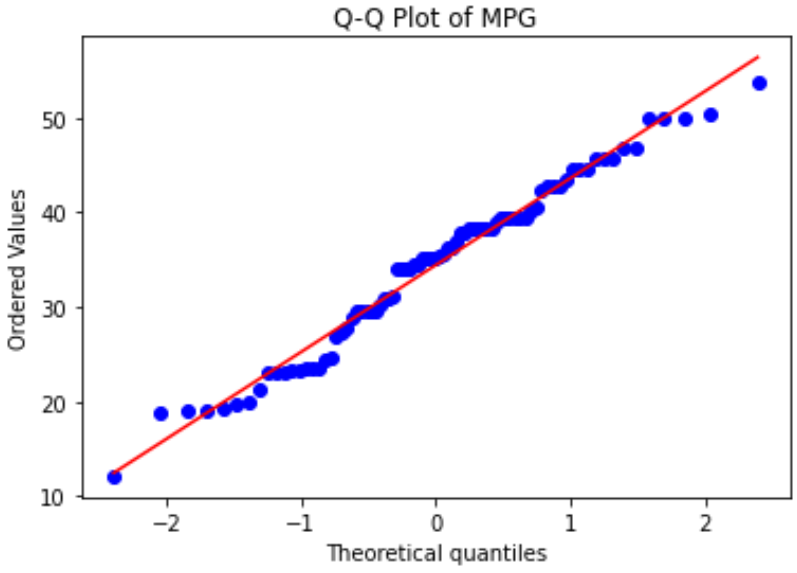
c. P (20<MPG<50)

Ans:-Pnorm(50,34.422,9.13144) – (1-pnormm(20,34.422,9.13144)) = 0.01311818

Q 21) Check whether the data follows normal distribution

a) Check whether the MPG of Cars follows Normal Distribution

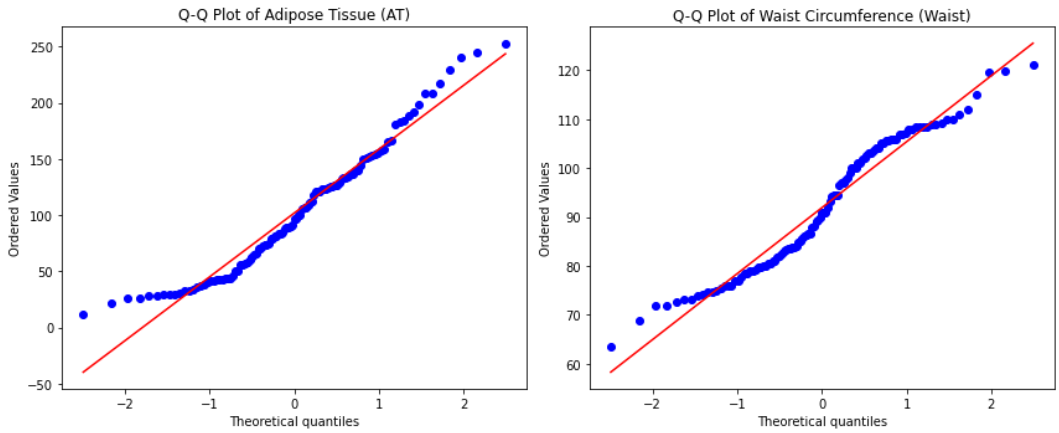
Dataset: Cars.csv



Distributed normally

b) Check Whether the Adipose Tissue (AT) and Waist Circumference(Waist) from wc-at data set follows Normal Distribution

Dataset: wc-at.csv



Q 22) Calculate the Z scores of 90% confidence interval,94% confidence interval, 60% confidence interval

Solution-

Confidence Interval	Z Scores
60%	-0.8416212
90%	-1.6448544
94%	-1.880794

Q 23) Calculate the t scores of 95% confidence interval, 96% confidence interval, 99% confidence interval for sample size of 25

Solution-

Confidence interval	T scores
95%	2.063899
96%	2.171545
99%	2.79694

Q 24**)** A Government company claims that an average light bulb lasts 270 days. A researcher randomly selects 18 bulbs for testing. The sampled bulbs last an average of 260 days, with a standard deviation of 90 days. If the CEO's claim were true, what is the probability that 18 randomly selected bulbs would have an average life of no more than 260 days

Hint:

rcode → pt(tscore,df)

df → degrees of freedom