|  |  |
| --- | --- |
| 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 |

Q1) Identify the Data type for the Following:

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 | Interval |
| Weight | Ratio Scale |
| Hair Color | Nominal |
| Socioeconomic Status | Nominal |
| Fahrenheit Temperature | Interval |
| Height | Ratio Scale |
| Type of living accommodation | Nominal |
| Level of Agreement | Ordinal |
| IQ(Intelligence Scale) | Ratio Scale |
| Sales Figures | Ratio Scale |
| Blood Group | Nominal |
| Time Of Day | Interval |
| Time on a Clock with Hands | Interval |
| Number of Children | Ordinal |
| Religious Preference | Nominal |
| Barometer Pressure | Interval |
| SAT Scores | Ordinal |
| Years of Education | Nominal |

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

**ANS:- Probability of getting two heads and one tail is 3/8.**

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

1. Equal to 1
2. Less than or equal to 4
3. Sum is divisible by 2and 3

ANS:- a) Probability that sum is Equal to 1 = 0

b) Less than or equal to 4 = 1/6

c) Sum is divisible by 2 and 3 = 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**:- Probability that none of the balls drawn is blue is 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:- Expected number of candies for a randomly selected child  = 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.

**Use Q7.csv file**

Q8) Calculate Expected Value for the problem below

1. 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:- Expected Value of the Weight of that patient = 145.33

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

**Cars speed and distance**

**Use Q9\_a.csv**

**SP and Weight(WT)**

**Use Q9\_b.csv**

**Q10) Draw inferences about the following boxplot & histogram**



**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?

**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?

ANS:- MEAN:- 41

MEDIAN:- 40

STANDARD DEVIATION :- 5.208167

VARIANCE:- 27.125

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

ANS:- The distribution has zero skewness.

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

ANS:- If the mean is greater than the median, the distribution is positively skewed.

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

ANS:- :- If the median is greater than the mean, the distribution is negatively skewed.

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

ANS:-Positive values of kurtosis indicate that a distribution has thinner peak and possess thick tails.

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

ANS:- :-Negative values of kurtosis indicate that a distribution has thicker peak and possess thin tails.

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



What can we say about the distribution of the data?

ANS:- A box plot shows the distribution of data. It is useful in visualizing skewness in data.

What is nature of skewness of the data?

ANS:- The nature of the skewness of the data is negatively skewed because the median is wider to the lower quartile.

What will be the IQR of the data (approximately)?   
ANS:- The IQR of the data is approximately 8.

Q19) Comment on the below Boxplot visualizations?



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

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

Data \_set: Cars.csv

Calculate the probability of MPG ofCars for the below cases.

MPG<- Cars$MPG

* 1. P(MPG>38)
  2. P(MPG<40)

c. P (20<MPG<50)

Q 21) Check whether the data follows normal distribution

1. Check whether the MPG of Cars follows Normal Distribution

Dataset: Cars.csv

ANS:- The MPG of Cars follows Normal Distribution.

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

Dataset: wc-at.csv

ANS:- The Adipose Tissue (AT) and Waist Circumference(Waist) not follows Normal Distribution.

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

ANS:- Z score for 90% of confidence interval=1.645

Z score for 94% confidence interval=1.88

Z score for 60% confidence interval= 0.253

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

ANS:-T score of 95% confidence interval for sample size of 25 with df = n-1 = 25-1 = 24 :- 0.264

T score of 96% confidence interval for sample size of 25 with df = n-1 = 25-1 = 24 :- 0.264

T score of 99% confidence interval for sample size of 25 with df = n-1 = 25-1 = 24 :-2.797

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

ANS:- pt(-0.471,17)

0.321814

The Probability of the bulbs lasting less than 260 days on average of life 0.321814.