|  |  |
| --- | --- |
| 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 |
| Hair Color | Nominal |
| Socioeconomic Status | Ordinal |
| Fahrenheit Temperature | Interval |
| Height | Ratio |
| Type of living accommodation | Nominal |
| Level of Agreement | Nominal |
| IQ(Intelligence Scale) | Interval |
| Sales Figures | Ratio |
| 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 | Interval |
| Years of Education | Interval |

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

Ans. The probability that two heads and one tail = 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 2 and 3

**Ans.** A) Equal to 1

No of possible outcomes N = 6\*2= 36

The sum is equal to 1 = 0

b) less than equal to 4

No of favorable outcomes = (1,1), (1,2), (1,3), (2,1), (2,2), (3,1) = 6

The possibility of less than or equal to 4 = 6/36 =1/6

C) Sum is divisible by 2 and 3

No of favorable outcomes = (1,5), (2,4), (3,3), (4,2), (5,1), (6,6) = 6

The possibility of divisible by 2 and 3 = 6 / 36 = 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 of none of the balls drawn= (5/7\*4/6) = 20/42 = 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 = 1\*0.015 + 4\*0.20 + 3\*0.65 + 5\*0.005 + 6\*0.01 + 2\*0.120

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**

**Ans.**  See Q7 basic statistics level 1 python notebook.

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.**

No of patients = 9

Probability of selecting each patient = 1/9

Expected value = (1/9)108 + (1/9)110 + (1/9)123 + (1/9)134 + (1/9)135 + (1/9)145 + (1/9)167 + (1/9)187 + (1/9)199

Expected value of the weight of that patient = 145.33

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

Car’s speed and distance

Use Q9\_a.csv

SP and Weight (WT)

Use Q9\_b.csv

**Ans.** See Q9 basic statistics level 1 python notebook.

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



Ans.

Histogram shows the data distribution is positively skewed that means most of the data presents up to the mean.

Boxplot shows the outliers present in the data and all the outliers are lying above the upper extreme.

**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?

Ans. See Q11 basics statistics level 1 python notebook.

**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. See Q12 basics statistics level 1 python notebook.

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

Ans.

When mean, median are equal the data distribution is symmetric. So the distribution is normal.

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

Ans.

When mean > median the skewness is positively or right skewed and most of the data present up to mean.

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

Ans.

When median > mean the skewness is negatively or left skewed and most of the data present up to mode.

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

Ans.

The positive kurtosis value indicates the data distribution is peaked and have thick tails. So is distribution most of the data present around the tails instead of mean. This type of kurtosis called as Leptokurtic.

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

Ans.

The negative kurtosis value indicates the data is peaked the tails thinner than the normal distribution. This type of kurtosis called as Platykurtic.

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



What can we say about the distribution of the data?

Ans.

Box plot shows the data is not normally distributed and median is towards the upper extreme.

What is nature of skewness of the data?

Ans.

The nature of the skewness is left so the distribution is negatively skewed and most of the data present up to the mode.

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

IQR = Q3 – Q1

=18 – 10

IQR = 8 (approximately)

Q19) Comment on the below Boxplot visualizations?



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

Ans.

* Both the boxplot has no outliers and has same median between 250 and 275
* Both the boxplot seems normally distributed and has no skewness
* The Boxplot 2 has higher data range when compared to the boxplot 1.

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

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

c. P (20<MPG<50)

Ans. See Q20 Basic statistics level 1 python notebook.

Q 21) Check whether the data follows normal distribution

1. Check whether the MPG of Cars follows Normal Distribution

Dataset: Cars.csv

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

Dataset: wc-at.csv

Ans. See Q21 Basic statistics level 1 python notebook.

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

Ans. See Q22 & Q23 Basic statistics level 1 python notebook.

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

Ans. See Q22 & Q23 Basic statistics level 1 python notebook.

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. See Q24 Basic statistics level 1 python notebook.