Que 1) Plot a histogram,

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Ans- To create a histogram for the given data, we can follow these steps:
Determine the number of bins or intervals we want for the histogram. In this case, let's use 5 bins.
Calculate the range of the data. Range = Maximum Value - Minimum Value.
Calculate the width of each bin. Width = Range / Number of Bins.
Create bins or intervals for the data.
Count how many data points fall into each bin.
Draw a bar for each bin with a height corresponding to the count of data points in that bin.
Here's the histogram for our data with 5 bins:
Data: 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99
Bins:
10-30
31-50
51-70
71-90
91-99
Count of Data Points in Each Bin:
10-30: 5 (10, 13, 18, 22, 27)
31-50: 5 (32, 38, 40, 45, 51)
51-70: 3 (56, 57)
71-90: 2 (88, 90)
91-99: 2 (92, 94, 99)
Now, we can create a histogram by drawing bars for each bin. The height of each bar corresponds to the count of data points in that bin. Here's a text representation of the histogram:

Que 2) In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean.

Ans- Confidence Interval=X¯±Z(nσ)

Where:

¯X¯ is the sample mean.

Z is the critical value from the standard normal distribution corresponding to the desired confidence level (80% in this case).

σ is the population standard deviation.

n is the sample size.

For an 80% confidence interval, the critical value Z can be found using a standard normal distribution table or a calculator. The critical value for an 80% confidence interval is approximately 1.282.

Given the information:

σ (population standard deviation) = 100

¯X¯ (sample mean) = 520

n (sample size) = 25

Z (critical value for 80% CI) ≈ 1.282

The calculated confidence interval is approximately (495.36, 544.64). This means we can be 80% confident that the true population mean falls within this interval.

Que 3) A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

a. State the null & alternate hypothesis.
b. At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Ans- To analyze the hypothesis test conducted by the sales manager regarding the percentage of citizens in city ABC who own a vehicle, we can follow the standard hypothesis testing procedure. The steps are as follows:

a. State the null and alternate hypotheses:

The null hypothesis (0H0) represents the statement to be tested, and the alternate hypothesis (1H1 or Ha) represents the opposing statement.

Null Hypothesis (0H0): The percentage of citizens in city ABC who own a vehicle is 60% or more.

Alternate Hypothesis (1H1 or Ha): The percentage of citizens in city ABC who own a vehicle is less than 60%.

Mathematically:

0H0: ≥0.60p≥0.60 (where p is the population proportion of vehicle owners)

1H1: <0.60p<0.60

b. Conduct the hypothesis test:

To determine whether there is enough evidence to support the idea that vehicle ownership in ABC city is 60% or less, you need to perform a hypothesis test using the sample data. We'll use a z-test for proportions in this case. The formula for the z-test statistic is:

=^−(1−)Z=np(1−p)p^−p

Where:

^p^ is the sample proportion (number of residents who own a vehicle / total sample size).

p is the value specified in the null hypothesis (0.60 in this case).

n is the sample size (250 residents).

Let's calculate ^p^:

^=170250=0.68p^=250170=0.68

Now, calculate the z-test statistic:

=0.68−0.600.60⋅(1−0.60)250Z=2500.60⋅(1−0.60)0.68−0.60

≈1.48Z≈1.48

c. Determine the critical value and make a decision:

You mentioned a significance level of 10%. This corresponds to a one-tailed test since we are interested in whether the percentage is less than 60%. You can find the critical z-value for a 10% significance level (α = 0.10) in the standard normal distribution table. For a one-tailed test, this is approximately -1.28 (since we're interested in the left tail).

Now, compare the calculated z-test statistic (1.48) to the critical value (-1.28):

Since 1.48 > -1.28, we fail to reject the null hypothesis.

d. Draw a conclusion:

At a 10% significance level, there is not enough evidence to support the idea that vehicle ownership in ABC city is 60% or less. Therefore, the car's belief that the percentage of citizens owning a vehicle is 60% or less is not supported by the survey data.
Please note that this conclusion is based on the specific significance level chosen (10%). If a different significance level were used, the conclusion might change.

Que 4) What is the value of the 99 percentile?

2,2,3,4,5,5,5,6,7,8,8,8,8,8,9,9,10,11,11,12

Ans- To find the 99th percentile of the given dataset, we need to arrange the data in ascending order and then identify the value at which 99% of the data falls below it.
Here is your dataset in ascending order:
2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12
Now, there are 20 data points in the dataset.
To find the 99th percentile, we want to find the value below which 99% of the data falls. To do this, calculate the position of the 99th percentile as follows:
Position of 99th percentile=99100×Position of 99th percentile=10099×n
Position of 99th percentile=99100×20=19.8Position of 99th percentile=10099×20=19.8
Since we can't have a fraction of a data point, we round up to the nearest whole number. Therefore, the 99th percentile corresponds to the 20th data point in the ordered list.
So, the 99th percentile value is 12, which is the 20th data point in the dataset.

Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.

Ans- In left-skewed and right-skewed data distributions, the relationships between the mean, median, and mode are as follows:
Left-Skewed (Negatively Skewed) Distribution:
Mean < Median < Mode
The mean is typically the smallest, followed by the median, and then the mode.
In a left-skewed distribution, the tail of the distribution extends to the left, and most of the data points are concentrated on the right side.
Here's a simple graphical representation of a left-skewed distribution:

```
  Mode

  |

  |          Mean

  |         __|__

  |        /    \

  |       /      \

  |      /        \

  |     /          \

  |_______/_____________________
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Right-Skewed (Positively Skewed) Distribution:
Mode < Median < Mean

The mean is typically the largest, followed by the median, and then the mode.
In a right-skewed distribution, the tail of the distribution extends to the right, and most of the data points are concentrated on the left side.
Here's a simple graphical representation of a right-skewed distribution:

```
Mean

|

|              Median

|             __|__

|            /     \

|          /         \

|        /             \

|      /                 \

|_______/______________________
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