Assignment 3 Solution

Q1: Which one of the following statements is incorrect?

a) If mean, median, and mode are all equal, then the distribution will be symmetrical (Hint: In a symmetric distribution, one half of the curve is the mirror image of the other half.)

b) Kurtosis studies the flatness or peakedness of the distribution (Hint: Kurtosis is a statistic that measures the extent to which a distribution contains outliers)

c) **If mean < median < mode, the distribution is positively skewed (Hint: extreme values (the values in the tail) affect the mean more than the median in positively skewed distribution)**

d) In leptokurtic frequency curve looks more peaked than the normal curve of bell-shaped distribution (Hint: Leptokurtic has a greater tendency for outliers)

Q2: Which of the following is not a measure of variability?

a) **Mean (Hint: a mean is simply defined as the average of the given set of numbers)**

b) Range (Hint: range of a set of data is the difference between the largest and smallest values)

c) Standard deviation (Hint: Standard Deviation shows how much variation (such as spread, dispersion) from the mean exists.)

d) Variance (Hint: variance measures variability from the average or mean)

Q3: Which one of the following deals with the symmetry of the distribution of collected data on both sides of the central value?

a) **Skewness (Hint: If mean, median, and mode are all equal, then distribution will be asymmetrical)**

b) Kurtosis (Hint: Kurtosis is a measure of the tailedness of a distribution)

c) Range (Hint: the range of a set of data is the difference between the largest and smallest values)

d) Variance (Hint: variance measures variability from the average or mean)

Q4: For a frequency distribution of variable x, mean = 32, median = 30, mode = 26. The distribution is:

a) **Positively skewed (Hint: Mean>Median>Mode)**

b) Negatively skewed (Hint: Mean < Median < Mode)

c) Mesokurtic (Hint: Probability distribution where extreme events are close to zero)

d) Platykurtic (Hint: Probability distribution is flatter than a normal distribution with shorter tails)

Q5: Find out the incorrect option.

a) $\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$ (Hint: a mean is simply defined as the average of the given set of numbers)

b) **Interquartile range (IQR) = $Q_3 - Q_2$ (Hint: The interquartile range also called the mid-spread)**

c) population SD: $\sigma = \sqrt{\sum_{i=1}^{n} \frac{(X_i - \bar{X})^2}{n}}$] (Hint: Standard Deviation shows how much variation (such as spread, dispersion) from the mean exists)

d) $Range = X_{largest} - X_{smallest}$ (Hint: range of a set of data is the difference between the largest and smallest values)

Q6: Snowballing sampling falls under the category of:

a) Random sampling (Hint: It means every item has an equal chance of being selected)

b) **Non-Random or Non-probability sampling (Hint: It means that not all members of the population have an equal chance to participate in the study)**

c) Stratified sampling (Hint: It is a method of sampling that involves the division of a population into smaller subgroups known as strata)

d) Judgement sampling (Hint: It is done based on the knowledge and judgment of the person who is selecting the person)

Q7: Consider a hypothesis where H0 = 35 against H1 < 35. The test is

a) Right-tailed (Hint: A Hypothesis Test where the rejection region is located to the extreme right of the distribution)

b) **Left-tailed (Hint: A Hypothesis Test where the rejection region is located to the extreme left of the distribution)**

c) Two-tailed (Hint: A Hypothesis Test where the rejection region is divided equally between 2 critical values at the extremities of the distribution)

d) Significance Level (Hint: The probability of rejecting the null hypothesis when it is true)

Q8: A researcher is studying the effects of excess phone usage on the eyesight of teenagers. When testing for the effect of excess phone usage on eyesight with $\alpha = 0.01$, you get $p = 0.002$, Your decision should be:

a) **Reject H_o, as a result there is a significant effect (Hint: null hypothesis states that there is no significant effect of excess phone usage on eyesight)**

b) Accept H_o, as a result there is no significant effect (Hint: null hypothesis states that there is no significant effect of excess phone usage on eyesight)

c) Reject H_o, as a result there is no significant effect (Hint: null hypothesis states that there is no significant effect of excess phone usage on eyesight)

d) Accept H_o, as a result there is a significant effect (Hint: null hypothesis states that there is no significant effect of excess phone usage on eyesight)

Q9: A real estate agent believes that the average closing cost of purchasing a new home is $7500. She selects 55 new home sales at random and finds that the average closing costs are $7700. The standard deviation of the population is $100. Test her belief at α=0.05. Which test do you use?

a) **Z-test for means (Hint: Z test is best suited when population SD with a sample size large than 30)**

b) T-test for means (Hint: T-test is best suited when population SD is not known and the sample size is less than 30)

c) Z- test for proportions (Hint: A one-proportion z-test is used to compare an observed proportion to a theoretical one.)

d) None of the above

Q10: Which of the following is incorrect?

a) the probability of committing a Type I error is called alpha (α) or level of significance (Hint: alpha equals the area under the curve that is in the rejection region beyond the critical values)

b) **the Type II error is committed by rejecting a true null hypothesis (Hint: the probability of type II error is β)**

c) Power is the probability of the statistical test rejecting the null hypothesis when the null hypothesis is false (Hint: power is equal to (1-β))

d) None of the above.