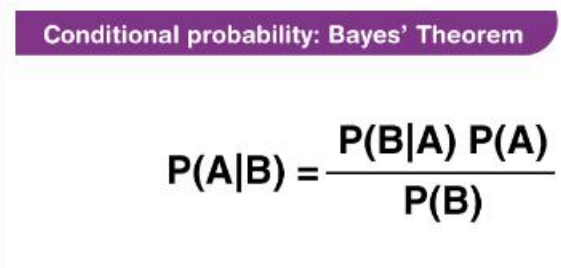
STATISTICS WORKSHEET-3

1. B
2. C
3. A
4. A
5. B
6. B
7. B
8. D
9. A

10. What Is Bayes' Theorem?

Answer: Bayes' theorem describes the probability of occurrence of an event related to any condition. It is also considered for the case of conditional probability. Bayes theorem is also known as the formula for the probability of "causes". For example: if we have to calculate the probability of taking a blue ball from the second bag out of three different bags of balls, where each bag contains three different colour balls viz. red, blue, black. In this case, the probability of occurrence of an event is calculated depending on other conditions is known as conditional probability



11. What is z-score?

Answer: A z-score gives us an idea of how far from the mean a data point is. It is an important topic in statistics. Z-scores are a method to compare results to a "normal" population. For example, we know someone's weight is 70 kg, but if you want to compare it to the "average" person's weight, looking at a vast table of data can be overwhelming. A z-score gives us an idea of where that person's weight is compared to the average population's mean weight. In this article, we will learn what is z score.

FORMULA

The equation is given by $z = (x - \mu)/ \sigma$.

μ = mean

σ = standard deviation

x = test value

When we have multiple samples and want to describe the standard deviation of those sample means, we use the following formula:

$z = (x - \mu)/ (\sigma/\sqrt{n})$

12. What is t-test?

Answer: The t-test is any statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. It can be used to determine if two sets of data are significantly different from each other, and is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known.

T-test uses means and standard deviations of two samples to make a comparison. The formula for T-test is given below:

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$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{\Delta}}}$$

where

$$s_{\bar{\Delta}} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

Where,

$\overline{x}$
= Mean of first set of values

$\overline{x}_2$
= Mean of second set of values

S_1
= Standard deviation of first set of values

S_2
= Standard deviation of second set of values

n_1
= Total number of values in first set

n_2
= Total number of values in second set.

The formula for standard deviation is given by:

$$S = \sqrt{\frac{\sum \left(x - \overline{x}\right)^2}{n - 1}}$$

Where,
x = Values given

$\overline{x}$
= Mean
n = Total number of values.

13. What is percentile?

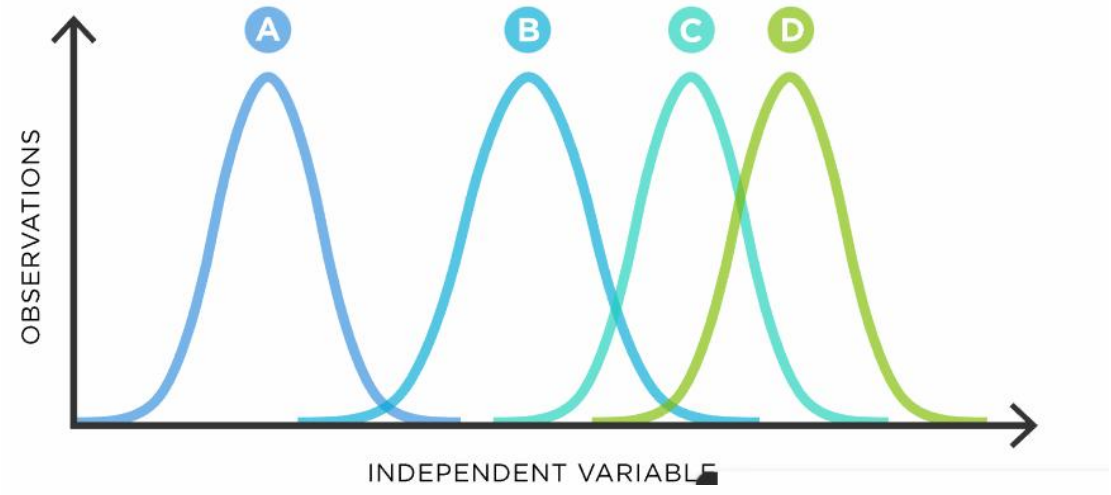
Answer: Percentile is defined as the value below which a given percentage falls under. For example, in a group of 20 children, Ben is the 4th tallest and 80% of the children are shorter than you. Hence, it means that Ben is at the 80th percentile. It is most commonly used in competitive exams such as SAT, LSAT, etc.

FORMULA:

$$Percentile = (n/N) \times 100$$

14. What is ANOVA?

Answer: **Analysis of Variance** (**ANOVA**) is a statistical formula used to compare variances across the means (or average) of different groups. A range of scenarios use it to determine if there is any difference between the means of different groups.



15. How can ANOVA help?

Answer: ANOVA is helpful for testing three or more variables. It is similar to multiple two-sample t-tests. However, it results in fewer type I errors and is appropriate for a range of issues. ANOVA groups differences by comparing the means of each group and includes spreading out the variance into diverse sources.