STATISTICS WORKSHEET-3

1-B

2-C

3-A

4-A

5-B

6-B

7-B

8-D

9-A

10-Bayes theorem determines the conditional probability of an event A given that event B has already occurred. Bayes theorem is also known as the Bayes Rule or Bayes Law. It is a method to determine the probability of an event based on the occurrences of prior events. It is used to calculate conditional probability. Bayes theorem calculates the probability based on the hypothesis.

Bayes theorem states that the conditional probability of an event A, given the occurrence of another event B, is equal to the product of the likelihood of B, given A and the probability of A. It is given as:

P(A|B) = P(B|A) P(A)
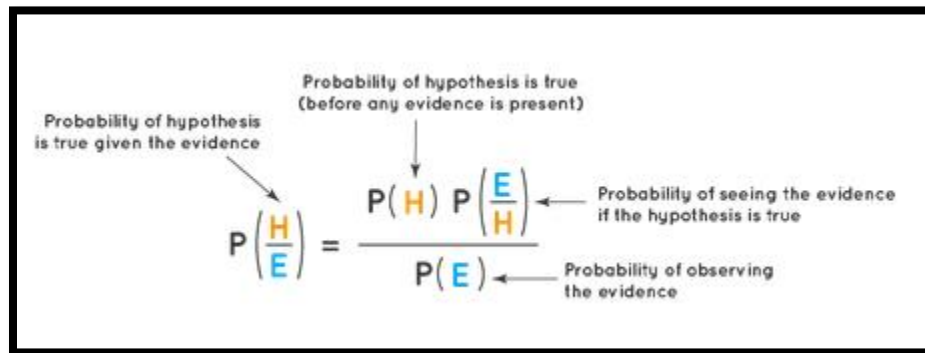
P(B)

Here, P(A) = how likely A happens (Prior knowledge)- The probability of a hypothesis is true before any evidence is present.

P(B) = how likely B happens (Marginalization)- The probability of observing the evidence.

P(A/B) = how likely A happens given that B has happened (Posterior)-The probability of a hypothesis is true given the evidence.

P(B/A) = how likely B happens given that A has happened (Likelihood)- The probability of seeing the evidence if the hypothesis is true.

11-A z-score describes the position of a raw score in terms of its distance from the mean, when measured in standard deviation units. The z-score is positive if the value lies above the mean, and negative if it lies below the mean.

It is also known as a standard score, because it allows comparison of scores on different kinds of variables by standardizing the distribution. A standard normal distribution (SND) is a normally shaped distribution with a mean of 0 and a standard deviation (SD) of 1
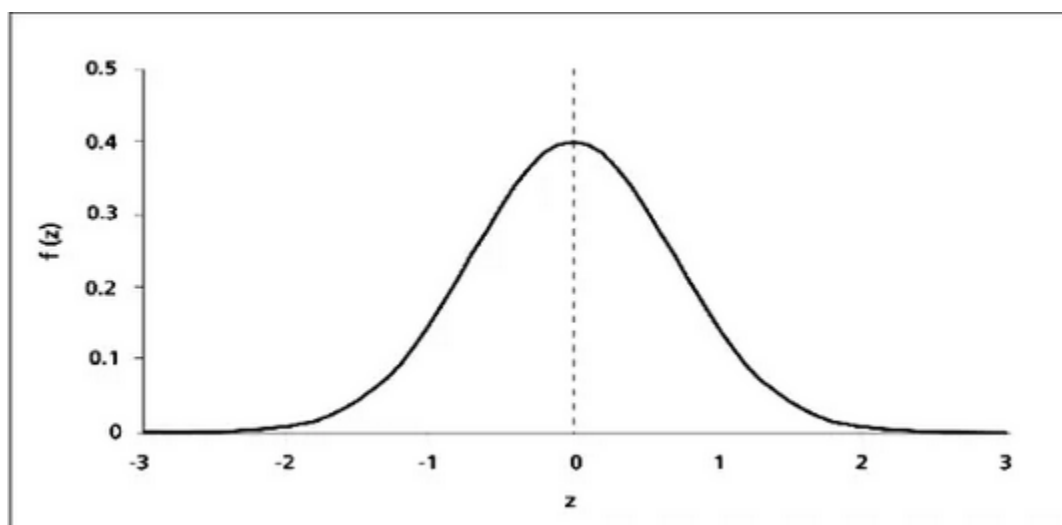
It is useful to standardized the values (raw scores) of a normal distribution by converting them into z-scores because:

(a) it allows researchers to calculate the probability of a score occurring within a standard normal distribution;

(b) and enables us to compare two scores that are from different samples (which may have different means and standard deviations).

12-A t-test is an inferential statistic used to determine if there is a significant difference between the means of two groups and how they are related. T-tests are used when the data sets follow a normal distribution and have unknown variances, like the data set recorded from flipping a coin 100 times.

The t-test is a test used for hypothesis testing in statistics and uses the t-statistic, the t-distribution values, and the degrees of freedom to determine statistical significance.

Calculating a t-test requires three fundamental data values including the difference between the mean values from each data set, the standard deviation of each group, and the number of data values. T-tests can be dependent or independent.

13-In statistics, a percentile is a term that describes how a score compares to other scores from the same set. While there is no universal definition of percentile, it is commonly expressed as the percentage of values in a set of data scores that fall below a given value.

We can calculate percentiles in statistics using the following formula:

$$P_x = \frac{x(n + 1)}{100}$$

P_x = The value at which x percentage of data lie below that value

n = Total number of observations

14-ANOVA is to test for differences among the means of the population by examining the amount of variation within each sample, relative to the amount of variation between the samples. It is a test to find out if survey or experiment results are significant. In other words,

they help you to figure out if you need to reject the null hypothesis or accept the alternate hypothesis.

In a regression study, analysts use the ANOVA test to determine the impact of independent variables on the dependent variable.

15-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. It is employed with subjects, test groups, between groups and within groups.