Set 3 Statistics worksheet 10

Q1 a

Q2 a

Q3 a

Q4 b

Q5 a

Q6 b

Q7 a

Q8 a

Q9 c

Q10 c -2.50

Q11 c

Q12 c

Q13 How do you find the test statistic for two sample means?

The two-sample *t*-test (also known as the independent samples *t*-test) is a method used to test whether the unknown population means of two groups are equal or not.

 The test statistic for a two-sample independent t-test is calculated by **taking the difference in the two sample means and dividing by either the pooled or unpooled estimated standard error**.

Q14
 The sample mean only considers a selected number of observations—drawn from the population data.

The sample mean is a central tendency measure. The arithmetic average is computed using samples or random values taken from the population. It is evaluated as the sum of all the sample variables divided by the total number of variables.

It is computed using the following formula:

$$\bar{x} = \sum x_i / n$$

- Here, $\bar{x}$ is the sample mean.
- $\sum x_i$ is the sum of all the sample observations.

- n is the **sample size** or the total number of observations.

> The expected value of the difference between all possible sample means is equal to the difference between population means. Thus,
>
> The standard deviation of the difference between sample means (σ_d) is approximately equal to: $\sigma_d = \text{sqrt}(\sigma_1^2 / n_1 + \sigma_2^2 / n_2)$

Q15

For the 2-sample t-test, the numerator is again the signal, which is the difference between the means of the two samples. For example, **if the mean of group 1 is 10, and the mean of group 2 is 4, the difference is 6**. The default null hypothesis for a 2-sample t-test is that the two groups are equal.