WORKSHEET_SET_3

STATISTICS WORKSHEET-10

Q1 to Q12 have only one correct answer. Choose the correct option to answer your question.

1. Rejection of the null hypothesis is a conclusive proof that the alternative hypothesis is
a. True
b. False
c. Neither

Ans: C

2. Parametric test, unlike the non-parametric tests, make certain assumptions about
a. The population size
b. The underlying distribution
c. The sample size

Ans: B

3. The level of significance can be viewed as the amount of risk that an analyst will accept when making a decision
a. True
b. False

Ans: A

4. By taking a level of significance of 5% it is the same as saying
a. We are 5% confident the results have not occurred by chance
b. We are 95% confident that the results have not occurred by chance
c. We are 95% confident that the results have occurred by chance

Ans: B

5. One or two tail test will determine
a. If the two extreme values (min or max) of the sample need to be rejected
b. If the hypothesis has one or possible two conclusions
c. If the region of rejection is located in one or two tails of the distribution

Ans: C

6. Two types of errors associated with hypothesis testing are Type I and Type II. Type II error is committed when
a. We reject the null hypothesis whilst the alternative hypothesis is true
b. We reject a null hypothesis when it is true
c. We accept a null hypothesis when it is not true

Ans: C

7. A randomly selected sample of 1,000 college students was asked whether they had ever used the drug Ecstasy. Sixteen percent (16% or 0.16) of the 1,000 students surveyed said they had. Which one of the following statements about the number 0.16 is correct?
a. It is a sample proportion.
b. It is a population proportion.

c. It is a margin of error.
d. It is a randomly chosen number.

Ans: A

8. In a random sample of 1000 students, $\hat{p} = 0.80$ (or 80%) were in favour of longer hours at the school library. The standard error of $\hat{p}$ (the sample proportion) is
a. .013
b. .160
c. .640
d. .800

Ans: A

9. For a random sample of 9 women, the average resting pulse rate is x = 76 beats per minute, and the sample standard deviation is s = 5. The standard error of the sample mean is
a. 0.557
b. 0.745
c. 1.667
d. 2.778

Ans: C

10. Assume the cholesterol levels in a certain population have mean μ= 200 and standard deviation σ = 24. The cholesterol levels for a random sample of n = 9 individuals are measured and the sample mean x is determined. What is the z-score for a sample mean x = 180?
a. –3.75
c. –2.50
c. −0.83
d. 2.50

Ans: C

11. In a past General Social Survey, a random sample of men and women answered the question “Are you a member of any sports clubs?” Based on the sample data, 95% confidence intervals for the population proportion who would answer “yes” are .13 to .19 for women and .247 to .33 for men. Based on these results, you can reasonably conclude that
a. At least 25% of American men and American women belong to sports clubs.
b. At least 16% of American women belong to sports clubs.
c. There is a difference between the proportions of American men and American women who belong to sports clubs.
d. There is no conclusive evidence of a gender difference in the proportion belonging to sports clubs.

Ans: C

12. Suppose a 95% confidence interval for the proportion of Americans who exercise regularly is 0.29 to 0.37. Which one of the following statements is FALSE?
a. It is reasonable to say that more than 25% of Americans exercise regularly.
b. It is reasonable to say that more than 40% of Americans exercise regularly.
c. The hypothesis that 33% of Americans exercise regularly cannot be rejected.
d. It is reasonable to say that fewer than 40% of Americans exercise regularly.

Ans: B

Q13 to Q15 are subjective answers type questions. Answers them in their own words briefly.

13. How do you find the test statistic for two samples?

Ans: 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.
The estimated standard error is an aggregate measure of the amount of variation in both groups.

Degrees of freedom: Varies by conditions, but the basic rule of thumb for hand calculations is the smaller of $n_1 - 1$ and $n_2 - 1$, where n is the sample size for each group.

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

Assumptions:

- Random samples
- Independent observations
- The population of **each group** is normally distributed.
- The population variances are equal.

14. How do you find the sample mean difference?

Ans: The mean difference, or difference in means, measures the absolute difference between the mean value in two different groups. In clinical trials, it gives you an idea of how much difference there is between the averages of the experimental group and control groups.

The definition tells for finding the *absolute* difference between two items.
In math, **a difference is a subtraction**.
For example, the difference between 10 and 2 is 8 (10 – 2 = 8). However, you run into problems with negative numbers. For example, the difference between -1 and 1 is: -1 – 1 = -2.
In real life terms, a difference, or distance, makes more sense if it's a positive value, so we take the **absolute value of the difference**: |-2| = 2.

15. What is a two sample t test example?

Ans: 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. We can see in the equation that when the two groups are equal, the difference also equals zero. As the difference between the two groups grows in either a positive or negative direction, the signal becomes stronger.

Just like with the 1-sample t-test, for any given difference in the numerator, as we increase the noise value in the denominator, the t-value becomes smaller. To determine that the groups are different, we need a t-value that is large.
