Statistics & Probability | 4th Quarter

Written Work 1: Hypothesis Testing

April 4 2021

Directions: Expression the null hypothesis H_0 and the alternative hypothesis H_1 in notation form and state whether the test is directional or non-directional in the following scenarios:

1. The principal of the school claims that the mean age of the teachers is 45 years. The mean age of the randomly selected 35 teachers is 42 years, which is not equal to what is claimed by the principal.

   $H_0: \mu = 45$
   $H_1: \mu \neq 45$
   Non-directional.

2. The mathematics teacher claims that the mean IQ of students is 110. The mean IQ of the 32 randomly selected Statistics students is 112 which is more than what the mathematics teacher claims.

   $H_0: \mu = 110$
   $H_1: \mu > 110$
   Directional.

3. It is claimed that the percentage of viewers tuned in to Channel 7's new sitcom is 30%. Out of the 250 viewers randomly selected, only 29% are tuned in to Channel 7's new sitcom. Can it be concluded that the percentage of viewers tuned in to Channel 7's is less than 30%?

   $H_0: \% = 30\%$
   $H_1: \% < 30\%$
   Directional.

4. The mean annual income of workers who are college graduates is greater than P100,000 a year.

   $H_0: \mu = 100000$
   $H_1: \mu > 100000$
   Directional.

5. The percentage of women who watch sports on TV is not 40% as claimed by the researcher.

   $H_0: \% = 40\%$
   $H_1: \% \neq 40\%$
   Non-Directional.

6. The editor of a publishing company claims that the mean time to write a novel is 16 months. Forty randomly selected authors said it is more than 16 months. Each of them said it takes 18 months to write a novel.

   $H_0: \mu = 16$
   $H_1: \mu > 16$

Directional.

7. A librarian of a school claims that all their Grade 8 students read an average of 10 storybooks a month with a standard deviation of 2 books. A random sample of Grade 8 students read an average of 12 books a month and a standard deviation of 1 book. The confidence statement is 95%.

   $H_0: \mu = 10$
   $H_1: \mu > 10$
   Directional.

8. It is claimed that 15% of the adult Filipinos are in favor of death penalty. Of the 1,000 adult Filipinos asked, only 14% are in favor of death penalty. Does this mean that the percentage of adult Filipinos who are in favor of death penalty is less than 15%?

   $H_0: \% = 15\%$
   $H_1: \% < 15\%$
   Directional.

9. A random sample of 200 students got a mean score of 62 with a standard deviation score of 5 in a knowledge test in mathematics. In the standardization of the test, $\mu = 50$ with $\sigma = 10$.

   $H_0: \mu = 50$
   $H_1: \mu > 50$
   Directional.

10. It is believed that the mean yearly salary of professors in the Philippines is ₱480,000.00. A random sample of 65 professors revealed a mean salary of ₱500,000.00. Can it be concluded that the mean yearly salary is greater than ₱480,000.00.

    $H_0: \mu = 480000$
    $H_1: \mu > 480000$
    Directional.

11. The Head of the P.E. Department of a certain high school claims that the mean height of Grade 7 students is 163 cm. The mean height of 45 randomly selected Grade 7 students is 161 cm. Using 0.01 significance level, can it be concluded that the mean height of Grade 7 students is different from 163 cm as claimed by the Head of the P.E. Department?

    $H_0: \mu = 163$
    $H_1: \mu < 161$
    Directional.

12. A random sample of 60 working students was taken in order to determine whether the average age of working students is different from 19 years.

    $H_0: \mu = 19$
    $H_1: \mu \neq 19$
    Non-Directional.

13. Last year the mean number of ladies' bags produced by GB Company was 2,500 each day. This year, the manager claims that there is an increase in the number of bags produced. A researcher who wants to find out whether this is true counted the number of bags produced each day for a period of one month. His computation resulted to a mean of 2,515 ladies' bag. At 0.05 significance level, is there enough evidence to conclude that the mean number of ladies' bags produced by GB Company is greater than 2,500?

    $H_0: \mu = 2500$
    $H_1: \mu > 2500$
    Directional.

14. The LB Company produces an average of 4% defective bulbs each day. Recently, some of the machines were upgraded. Out of the 400 bulbs randomly selected only 14 bulbs were found defective. Does this suggest that there is a decrease in the number of defective bulbs produced each day?

    $H_0: \% = 4\%$
    $H_1: \% < 4\%$
    Directional.

15. According to a factory employer, the mean working time of workers in the factory is 6 hours with a standard deviation of 0.5 hours. A researcher interviewed 50% of the employees and found out that their mean working time is 8 hours with a standard deviation of 1 hour.

    $H_0: \mu = 6$
    $H_1: \mu > 8$
    Non-Directional.