

(Last) Homework 10

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Hypothesis testing and regression

Exercise 1. Test the hypothesis

$$H_0 : \mu = 42.9 \text{ vs. } H_1 : \mu \neq 42.9; \bar{x} = 45.1, n = 16, s = 3.2, \alpha = 0.01.$$

Exercise 2. Test the hypothesis

$$H_0 : \mu = 120 \text{ vs. } H_1 : \mu < 120; \bar{y} = 114.2, n = 25, s = 18, \alpha = 0.08.$$

Exercise 3. Test the hypothesis

$$H_0 : \mu = 14.2 \text{ vs. } H_1 : \mu > 14.2; \bar{x} = 15.8, n = 9, s = 4.1, \alpha = 0.13.$$

Exercise 4. Use p -value method to test the hypothesis in the previous three exercises.

Exercise 5. Quality scores on a 10-point scale for two brands of orange juice are shown.

Brand A: 7,6,8,5,4

Brand B: 10,9,7,6,8

a) Test hypothesis that there is a difference between the mean scores of two brands at significance level $\alpha = 1\%$.

b) Test hypothesis that mean score of Brand B is larger than the mean score of Brand A at significance level $\alpha = 5\%$.

c) Use p -value method to test there is a difference between the mean scores of two brands.

Exercise 6. Consider the dataset:

$$(-3, 2), (1, 7), (4, 14), (9, 18), (10, 26).$$

a) Find the least-squares regression line $\hat{y} = a + bx$

b) For what value of x the predicted value $\hat{y} = 0$?

c) Construct 99% confidence interval for the predicted value \hat{y} .

d) Compute the correlation coefficient and interpret your findings.

Exercise 7. Suppose $H_0 : \mu = 120$ is tested against $H_1 : \mu \neq 120$. If $s = 10$ and $n = 16$, what P -value is associated with the sample mean $\bar{x} = 122.3$? Test the hypothesis.