

1. Give the geometric explanation of the two-sided t-test for testing $H_0 : \mu = 0$. Explain how to modify to test $H_0 : \mu = \mu_0$.

Read page 202 of the textbook.

2. Problem 6 on page 282. Also verify the decomposition of observations and confirm the orthogonality of the vectors.

- ANOVA table

Source	Df	Sum Sq	Mean Sq	F
Treatment	2	6	3	1.75
Error	7	12	1.743	

- Decomposition observations

$$\begin{bmatrix} 48 \\ 49 \\ 50 \\ 50 \\ 50 \\ 48 \\ 52 \\ 51 \\ 52 \\ 50 \end{bmatrix} = \begin{bmatrix} 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \end{bmatrix} + \begin{bmatrix} -1 \\ -1 \\ -1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \end{bmatrix} + \begin{bmatrix} -1 \\ 0 \\ 1 \\ 0 \\ 0 \\ -2 \\ 2 \\ 0 \\ 1 \\ -1 \end{bmatrix}$$

Check whether all possible inner products of the vectors are 0 or not.