

exercises :

Q17: consider the following hypothesis test  $H_0: \mu_d \leq 0$

$H_1: \mu_d > 0$

The following data are from matched samples taken from two pop.

element	1	2
1	21	20
2	28	26
3	18	18
4	20	20
5	26	24

a. compute the difference value for each element :  $d_i$

element	$d_i = 1-2$
1	1
2	-2
3	0
4	0
5	2

b. compute  $\bar{d}$  :  $\bar{d} = 1$

c. compute the standard deviation :  $S_d = 1$

d. Conduct a hypothesis test using  $\alpha = 0.05$ , what is your conclusion?  $df = 4$

$$t_{\text{test}} = \frac{\bar{d} - \mu_d}{\frac{sd}{\sqrt{n}}} = \frac{1 - 0}{\frac{1}{\sqrt{5}}} = 2.24$$

p-value :

Q18: The following data from matched sample taken from two populations

element	1	2	@ di
1	11	8	3
2	7	8	-1
3	9	6	3
4	12	7	5
5	13	10	3
6	15	15	0
7	15	14	1

b. compute  $\bar{d}$  :  $\bar{d} = 2$

c. compute the s.d :  $S_d = 2.08$

d. point estimator ? = 2  $\bar{d}$  is point estimator

e. provide 95% CI for the difference between the two pop. mean?

$$\begin{aligned} 0.95\% \text{ CI} &= \bar{d} \pm t_{\frac{\alpha}{2}} \frac{S_d}{\sqrt{n}} \\ &= 2 \pm 1.92 \\ &= [0.08, 3.92] \end{aligned}$$

$$\begin{aligned} df &= 6, \alpha = 0.025 \\ \Rightarrow t_{\frac{\alpha}{2}} &= 2.447 \end{aligned}$$

Q19:

individual	Television	Radio	T - R
1	22	25	-3
2	8	10	-2
3	25	29	-4
4	22	19	3
5	12	13	-1
6	26	28	-2
7	22	23	-1
8	19	21	-2
9	21	21	0
10	23	23	0
11	14	15	-1
12	14	18	-4
13	14	17	-3
14	16	15	1

a. - sample mean of Television = 18.8 , sd = 5.41 .

- sample mean of Radio = 20 , sd = 5.42

Radio use greater than Television .

b.  $\alpha = 0.05$  , test for a difference between the pop. mean . what is the p-value ?

$$t = \frac{\bar{d} - \mu_{d=0}}{\frac{sd}{\sqrt{n}}} =$$

p-value  $\rightarrow$

Q20: