Part 3

16. $\mu = 7.4$

$\bar{x} = 7.9$

$\sigma = 1.21$

n = sample size = 18

Null hypothesis

$H_0: \mu = 7.4$

Alternative hypothesis

$H_1: \mu > 7.4$

α - level = 0.05

t-statistic is used because $n < 30 = 18$

$$t_c = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{7.9 - 7.4}{1.21/\sqrt{18}} = 1.7532$$

t-value from tables = 1.740

From this test, we conclude that we accept since t-value < than the t-statistic value or $t_c > t$-value.

$$\text{Effect size} = \frac{\bar{x} - \mu}{\sigma} = \frac{7.9 - 7.4}{1.21} = 0.4132$$

17. 96, 103, 113, 119, 129 , $n = 5$

$\bar{x} = 112$

$$\sigma = \sqrt{\left[\frac{\Sigma x^2}{n} - \bar{x}^2\right]\frac{1}{n-1}} = \sqrt{\left[\frac{63396}{5} - 112^2\right]\frac{1}{4}} = 11.6275$$

$\mu = 100.5$

Null hypothesis

$H_0: \mu = 100.5$

Alternative hypothesis

$H_1: \mu > 100.5$

α - level $= 0.05$

t - statistics is used because $n = 5$ $5 < 30$

$$t_c = t\text{-statistic} = \frac{\bar{X} - \mu}{S/\sqrt{n}} = \frac{112 - 100.5}{11.6275/\sqrt{5}} = 2.250$$

t - value from the table $= 1.740$

Conclusion ; We accept the null hypothesis

$$\text{Effect size} = \frac{\bar{X} - \mu}{\sigma} = \frac{112 - 100.5}{11.6275} = \underline{\underline{1.006}}$$

Scanned with CamScanner

18. α - level = 0.05

Converse	Nike	Difference (d)
3.4	3.1	0.3
3.2	3.2	0
4.8	4.1	0.7
4.4	4	0.4

~~μ_d~~ $\bar{X}_d = 0.35$

$\sigma_d = 0.25$

Null hypothesis : $H_0 : \mu_d \geq 0$

Alternative hypothesis : $H_a : \mu_d \leq 0$

$df = n - 1 = 4 - 1 = 3$ t_3 is used

$$t_c = \frac{\bar{X}_d - \mu_d}{\sigma_d/\sqrt{n}} = \frac{0.35}{0.25/\sqrt{4}} = 2.8$$

t-value from the table = 2.353

t_c exceeds t-value and therefore the difference between converse and nike is positive. We therefore accept the hypothesis. This means the coach should reject the new shoes since they take longer