MAT 2180 Tatiana Frolova

Walking through diffrent seasons

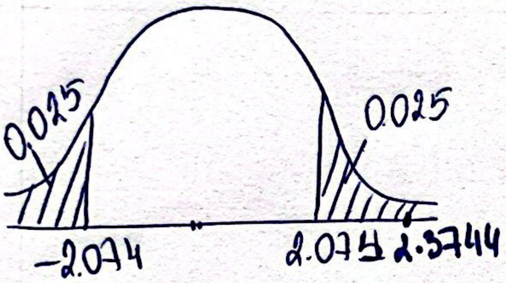
(4) $H_0: \mu_1 - \mu_2 = 0$ $\alpha = 0.05 \Rightarrow \alpha/2 = 0.025$

$H_a: \mu_1 - \mu_2 \neq 0$ $d.f = n_1 + n_2 - 2 = 12 + 12 - 2 = 22$

t-table $\Rightarrow 2.074$

$\bar{x}_1 = 50679.5$ $S_1 = 6116.99$

$\bar{x}_2 = 45078.33333$ $S_2 = 5418.46$



$$\boxed{t = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}}$$ where

$$\boxed{S_p^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

$$S_p^2 = \frac{(12-1) \times 6116.99^2 + (12-1) \times 5418.46^2}{12+12-2} = 33388621.9$$

$$t = \frac{(50679.5 - 45078.33333)}{\sqrt{33388621.9 \times \left(\frac{1}{12} + \frac{1}{12}\right)}} = 2.3744$$ p-value $= 0.0267$

$\boxed{\text{Reject } H_0 \text{ if } t > t_{\alpha/2} \text{ or p-value} < 0.05}$

Conclusion:

Reject H_0 since $2.3744 > 2.074$ and $0.0267 < 0.05$
there is sufficient evidence that steps/walking mean popul. in the summer season is different than winter season.

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(5)

95% confidence Interval

$$\boxed{\bar{x}_1-\bar{x}_2 \pm t_{\alpha/2} \times \sqrt{s_p^2 \times \left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

d.f. n_1+n_2-2

$$50679.5-45078.33333 \pm 2.074 \times \sqrt{33388621.9 \times \left(\frac{1}{12}+\frac{1}{12}\right)}$$

$$5601.16667 \pm 4892.517344$$

$$(708.6493;\ 10493.68401)$$

We are 95% confident that $\mu_1-\mu_2$ that true difference in population meen in steps is somewhere between 708.65 and 10493.68 steps of walking