7.1 by using case II:

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1. parameter of intrest: μ = true averge activion temperture

2. Null hypothesis: $H_0: \mu = 130$ [null value $= \mu_0 = 130$]

3. Alternative hypothesis: $H_a: \mu \neq 130$ (in eather direction when it's claimed value)

4. Test astatistic value by using case II when we domot have σ (the popultion standre deviton)

$$z = \frac{\bar{x} - \mu_0}{S/\sqrt{n}}$$

$n = 9$

$\bar{x} = 131.08°F$ (sample mean)

$\mu_0 = 130.0°F$ (null value)

sample standerd deviation $= S = \sqrt{\frac{\sum_{i=1}^{9}(x_i - \bar{x})^2}{n-1}}$

From HW7_1.py

Sample_variance = np.sum((x-xbar)**2)/(n-1)

S = np.sqrt(Sample_variance) # 1.450

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5. Since the alternative hypothesis $H_a \neq 130$ [we use two tailed test]. We want to reject H_a if Z sits ~~in the~~ in the left tail or right tail. $\alpha = 0.01$ imples that our rejection region is $Z \geq Z_{0.005}$ or $Z \leq -Z_{0.005}$. From table A3 $Z_{0.005} = 2.58$, so the rejectio area is $Z \geq 2.58$ or $Z \leq -2.58$

6. we will compute Z

$$Z = \frac{\bar{X} - \mu_0}{S/\sqrt{n}} = \frac{[131.08 - 130]}{1.450/\sqrt{9}} = 2.23$$

This is observed sample mean is more than 2.23 null hypothesis [H_0]

7. The value of $Z = 2.23$ which doesn't fall in the rejection value $[-2.58 < 2.23 < 2.58]$, so H_0 can't be rejected at $\alpha = 0.01$. The data doesn't give strong claim ~~to~~.

7.1 by using case III.

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In this case we don't know the population standard deviation σ and we don't have alot of dat.

1. parameter of intrest: μ = true average activion tempertue

2. Null hypothes: $H_0: \mu = 130$ [null value $= \mu_0 = 130$]
3. Alternative hypothess: $H_a: \mu \neq 130$ [in either tailed]

4. Test astatic value by using Case III

$$T = \frac{\bar{x} - \mu}{S/\sqrt{n}}$$

. we consider testing $H_a: \mu = \mu_0$

$$T = \frac{\bar{x} - \mu_0}{S/\sqrt{n}}$$

$n = 9$

$\bar{x} = 131.08\ f^\circ$

$\mu_0 = 130.0\ f^\circ$

s from case II $= 1.450$ $\therefore S = 1.450$

and from HW7_1.2.py

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5. Since the alternative hypothesis $H_a \neq 130$, we want to reject H_a if T sits in either tail].
$\alpha = 0.01$ imples that our rejection ~~fr~~ ~~reg~~ region is $T > T_{0.005, 8}$ or $T < T_{0.005, 8}$. From table

As $T_{0.005, 8} = 3.355$, so the rejection area is $T_{0.005, 8} \geq 3.355$ or $T_{0.005, 8} \leq -3.355$.

6. we will compute T

$$T = \frac{\bar{X} - \mu_0}{(S/\sqrt{n})} = \frac{[131.08 - 131.0]}{1.450/\sqrt{9}} = 2.23$$

This observed that sample mean is more than 2.23 from Ho

7. The value of $T = 2.23$ which dosnt fall in the rejction area $[-3.355 < 2.23 < 3.355]$, so Ho can't be rejcted becouse our data dosn't support us to rejct it