

Question 4

claim:  $\mu > 65$

Alternative:  $\mu \leq 65$

$$H_0: \mu = 65$$

$$H_a: \mu > 65$$

$$\alpha = 0.05$$

p-value:

$$T = \frac{\bar{X} - \mu}{s/\sqrt{n}}$$

$$\bar{X} = 67.600$$

$$s = 7.9470$$

$$T = \frac{67.600 - 65}{7.9470/\sqrt{10}} = 1.0346$$



$$P(T \geq 1.0346) = 1 - P(T \leq 1.0346, 9)$$

$$p\text{-value} = 0.1639$$

$$\frac{p\text{-value}}{0.1639} > \frac{\alpha}{0.05}$$

Fail to reject  $H_0$

$\therefore$  Since  $p\text{-value} > \alpha$ , we fail to reject the null hypothesis

confidence interval:

$$H_0: \mu = 65$$

$$H_a: \mu > 65$$

Population variance,  $\sigma^2$ , is unknown

$$\alpha = 0.05$$

use 95% confidence interval

$$\left( \bar{x} - t_{\alpha}^{n-1} \frac{s}{\sqrt{n}}, +\infty \right)$$

$$\bar{x} = 67.6$$

$$s = 7.9470$$

$$n = 10$$

$$\left( 67.6 - t_{0.05}^9 \times \frac{7.9470}{\sqrt{10}}, \infty \right)$$

$$(62.9933, \infty)$$

$\mu \in (62.9933, \infty) \Rightarrow$  w. fail to reject the null hypothesis

Le test post:

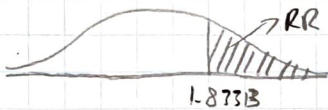
$$H_0: \mu = 65$$

$$H_a: \mu > 65$$

$$\text{Test-statistic} = 1.0346$$

Rejection region:  $t_{\alpha}(n-1)$

$$t_{0.05}(9) = 1.833113$$



$$\frac{\text{Test-statistic}}{1.0346} < \frac{\text{Rejection region}}{1.8331}$$

→ Fail to reject null hypothesis

∴ since the test statistic does not fall in the rejection region, we fail to reject the null hypothesis