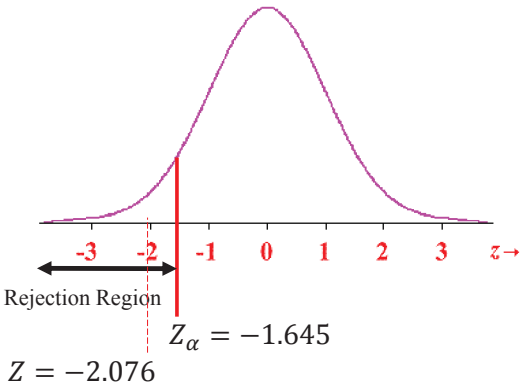
Question 1

- n=51, $\bar{X}$ =485 , S = 17.2
- $H_{0:}$ $\mu = \mu_0$ =490
- H_1: $\mu < \mu_0$ = 490 (at maximum)
- $Z = \frac{\bar{X}-\mu_0}{S/\sqrt{n}} = \frac{485-490}{17.2/\sqrt{51}} = -2.076$
- $Z_\alpha = Z_{0.05} = -1.645$
- Falls in Rejection Region/enough evidence to support H_1 =>Reject H_0

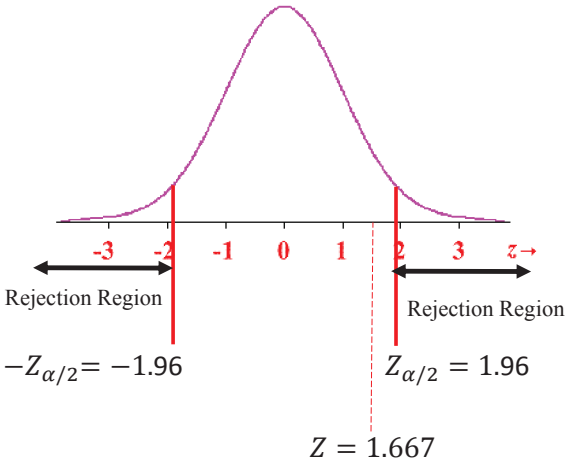
$$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}} \text{ if } \sigma \textbf{ known or } Z = \frac{\bar{X}-\mu_0}{\sigma_{\bar{X}}} = \frac{\bar{X}-\mu_0}{s/\sqrt{n}} \text{ if } \sigma \textbf{ unknown but } n \geq 30$$



Question 2

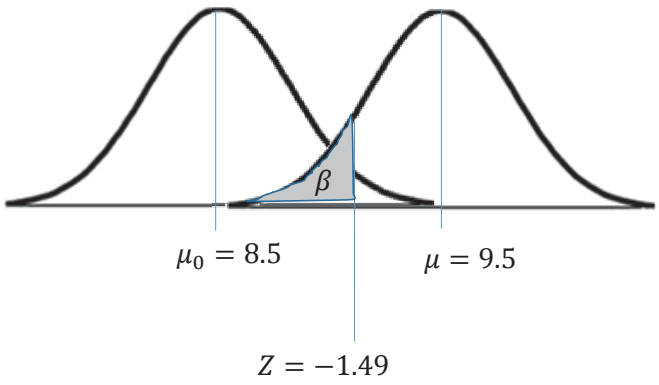
- n=5, $\bar{X}$ =9.5, σ = 2
- $H_{0:}$ $\mu = \mu_0$ =0.8
- H_1: $\mu \neq \mu_0$ = 0.8
- $Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}} = \frac{9.5-0.8}{2/\sqrt{5}} = 1.667$
- $Z_{\alpha/2} = Z_{0.025} = 1.96$
- Doesn't Falls in Rejection Region/ Not enough evidence to support H_1 =>fail to Reject H_0

$$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}} \text{ if } \sigma \textbf{ known or } Z = \frac{\bar{X}-\mu_0}{\sigma_{\bar{X}}} = \frac{\bar{X}-\mu_0}{s/\sqrt{n}} \text{ if } \sigma \textbf{ unknown but } n \geq 30$$



Question 3

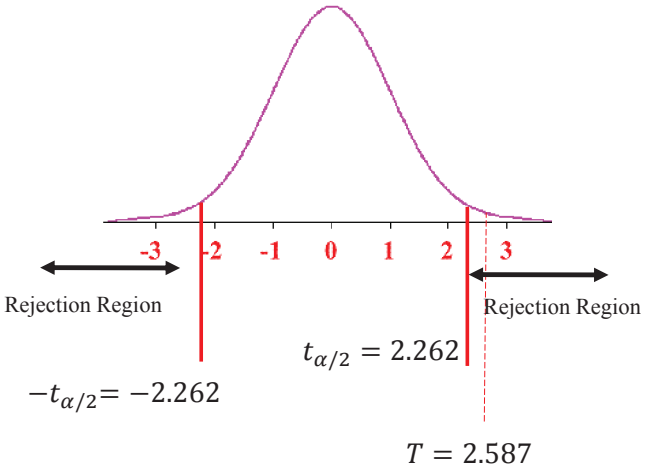
- n=5, $\bar{X}$ =8.7, $\sigma = 1.2$
- $H_{0:}$ $\mu = \mu_0$ =8.5
- H_1: $\mu > \mu_0 = 8.5$
- Specific alternative μ=9.5
- $Z = \frac{\bar{X}-\mu}{\sigma/\sqrt{n}} = \frac{8.7-9.5}{1.2/\sqrt{5}} = -1.49$
- $P(Z < -1.49) = 0.068 = \beta$



Question 4

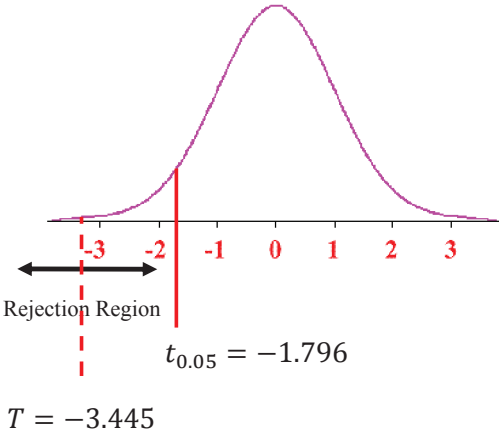
- σ unknown
- n=10, $\bar{X}$ =1290, $S = 110$
- $H_{0:}$ $\mu = 1200$
- H_1: $\mu \neq 1200$
- $T = \frac{\bar{X}-\mu_0}{s/\sqrt{n}} = \frac{1290-1200}{110/\sqrt{10}} = 2.587$
- $t_{\alpha/2} = t_{0.025} = 2.262$
- Falls in Rejection Region

=>Reject H_0



Question 5

- σ unknown
- n=12, $\bar{X}$ =37.2833, S = 2.73
- $H_{0:}$ $\mu = 40$
- H_1: $\mu < 40$
- $T = \frac{\bar{X}-\mu_0}{s/\sqrt{n}} = \frac{37.283-40}{2.732/\sqrt{12}} = -3.445$
- $t_\alpha = t_{0.05} = -1.796$
- Falls in Rejection Region
- =>Reject H_0



Question 6

n=12, $\bar{X}$ =20

Uniform Distribution?

Expected frequency for each grade is the same, i.e. the mean

$\bar{x} = 20 = e_i$

Grade	A	B	C	D	F
Frequ. oi	14	18	32	20	16
Expected Frequ. ei	20	20	20	20	20

$$\chi^2 = \sum_{i=1}^{5} \frac{(o_i - e_i)^2}{e_i}$$

$$\chi^2 = \frac{(14-20)^2}{20} + \frac{(18-20)^2}{20} + ... + \frac{(16-20)^2}{20} = 10.00$$

$$\alpha = 0.05 \Rightarrow \chi^2_{\alpha=0.05\ (df=4)} = 9.488$$

=> Reject Ho