Sampling Distributions:(6.4)

1) Sampling Distributions of sample Mean $\bar{x}$
2) Sampling Distribution of the sample Proportion $\hat{p}$:
3) Sampling Distribution of the two sample means $\bar{x}_1 - \bar{x}_2$
4) Sampling Distribution of the two sample Proportions $\hat{p}_1 - \hat{p}_2$

(ask about probability of sample statistics $\bar{x}$, $\hat{p}$, $\bar{x}_1 - \bar{x}_2$, $\hat{p}_1 - \hat{p}_2$)and give information about population parameters

Steps to answer:

- Compute means ($\mu_{\bar{x}}$, $\mu_{\bar{x}_1-\bar{x}_2}$, $\mu_{\hat{p}}$, $\mu_{\hat{p}_1-\hat{p}_2}$)
- Compute variance (${\sigma^2}_{\bar{x}}$, ${\sigma^2}_{\bar{x}_1-\bar{x}_2}$, ${\sigma^2}_{\hat{p}}$, ${\sigma^2}_{\hat{p}_1-\hat{p}_2}$)
- Compute standard deviation or "sd" Standard error s.e "($\sigma_{\bar{x}}$, $\sigma_{\bar{x}_1-\bar{x}_2}$, $\sigma_{\hat{p}}$, $\sigma_{\hat{p}_1-\hat{p}_2}$)
- Use $Z = \dfrac{value - mean}{standard\ error}$,(Standard deviation = Standard error)

Symbol

	sample	population
mean	$\bar{x}$	**μ**
variance	s^2	$\boldsymbol{\sigma^2}$
Standard deviation	s	**σ**
proportion	$\hat{p}$	**p**

Estimate population parameters

- point estimate
- interval estimate

point estimate:

Point estimate for (μ) is $\bar{x}$
Point estimate for (σ) is S
Point estimate for (p) is $\boldsymbol{\hat{p}}$
Point estimate for (μ_1**-**$\boldsymbol{\mu_2}$ **) is** $\bar{x}_1 - \bar{x}_2$
Point estimate for ($\boldsymbol{p_1}$**-**$\boldsymbol{p_2}$ **) is** $\hat{p}_1 - \hat{p}_2$

Interval estimate(ch6)

1) interval for population mean **μ**
2) interval for two population means $\mu_1 - \mu_2$ (not related)
3) interval for population proportion **p**
4) interval for two population proportions $p_1 - p_2$
5) interval for two population means $\mu_1 - \mu_2$ (related or paired)(in chapter 7)

(ask about population parameters **μ** , $\mu_1 - \mu_2$, **p** , $p_1 - p_2$ and give information about sample statistics)

> The general formula:
>
> point estimate ± (table value(z or t)) × $\sqrt{\frac{variance}{n}}$
>
> = Estimator∓ (reliability coefficient) x (standard error)

****

$s_p^2 =$ *estimate pooled common variance*

s_p = *estimate pooled common Standard deviation*

$z_{1-\frac{\alpha}{2}}$, $t_{1-\frac{\alpha}{2}}$ = reliability coefficient , *table value*

$\bar{p}$= pooled estimate proportion

Test Hypotheses (ch7)

1) test for population mean **μ**
2) test for two population means $\mu_1 - \mu_2$ (not related)
   note: degree of freedom for T is $(df = n_1 + n_2 - 2)$
   (when use T-test)
3) test for population proportion **p**
4) test for two population proportions $p_1 - p_2$
5) test for two population means $\mu_1 - \mu_2$ (related or paired)
   note: degree of freedom for T is $(df = n - 1)$

   ask about population parameters **μ** , $\mu_1 - \mu_2$, **p** , $p_1 - p_2$ and give information about sample statistics

Steps

1) data
2) assumptions
3) hypotheses
4) test statistic
5) decision
6) conclusion

الجداول من   الملزمه

Paired Sample

1) Confidence interval
2) test hypotheses

1)Confidence interval(Paired or related population)

Use $\bar{D} \pm t_{1-\frac{\alpha}{2},n-1} \frac{s_D}{\sqrt{n}}$ (df=n-1)

And

$$\bar{D} = \frac{\sum_{i=1}^{n} D_i}{n}$$ (mean of difference)

$$s_D^2 = \frac{\sum_{i=1}^{n}(D_i - \bar{D})^2}{n-1}$$ (variance of difference)

$$s_D = \sqrt{s_d^2}$$ ($standard\ \ deviation\ of\ difference$)

2)Test hypotheses(Paired or related population)

1) data
2)Assumption: normal + paired
3)Hypotheses:
we have three cases

Case I : H_0: $\mu 1 = \mu 2 \rightarrow \mu_1 - \mu_2 = 0 \rightarrow \mu_d = 0$
H_A: $\mu_1 \neq \mu_2 \rightarrow \mu_1 - \mu_2 \neq 0 \rightarrow \mu_d \neq 0$

e.g. we want to test that the mean for first population is different from second population mean.

Case II : H_0: $\mu 1 = \mu 2 \rightarrow \mu_1 - \mu_2 = 0 \rightarrow \mu_d = 0$
H_A: $\mu_1 > \mu_2 \rightarrow \mu_1 - \mu_2 > 0 \rightarrow \mu_d > 0$

e.g. we want to test that the mean for first population is greater than second population mean.

Case III : H_0: $\mu 1 = \mu 2$ $\rightarrow$ $\mu_1 - \mu_2 = 0$ $\rightarrow \mu_d = 0$

H_A: $\mu_1 < \mu_2$ $\rightarrow$ $\mu_1 - \mu_2 < 0 \rightarrow \mu_d < 0$

e.g. we want to test that the mean for first population is less than second population

4)$Test$:

$$T = \frac{\bar{D}}{\frac{S_d}{\sqrt{n}}}$$

5)Decision

Reject H_0 if :

Case1:

$$T_c < -T_{1-\frac{\alpha}{2},n-1} \; or \quad T_c > T_{1-\frac{\alpha}{2},n-1}$$

Case2:

$$T_c > T_{1-\alpha,n-1}$$

Case3:

$$T_c < -T_{1-\alpha,n-1}$$