

اللهم اجعل علمنا كله

مباحاً واجعله لوجهك

خالصاً

* Second full summary :-

=> Dis of sample mean :-

Is the pop Normal?
 yes → $\bar{X} \sim N(\mu, \frac{\sigma^2}{n})$ regardless of n.
 NO → take $n > 30 \Rightarrow \bar{X} \sim N(\mu, \frac{\sigma^2}{n})$ **CLT**

Is σ (pop std) given?
 yes ⇒ $Z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}}$
 NO ⇒ $t = \frac{\bar{X} - \mu}{S/\sqrt{n}}$

=> Dis of sample proportion :-

$\hat{P} \sim N(p, \frac{p(1-p)}{n}) \rightarrow Z = \frac{\hat{P} - p}{\sqrt{\frac{p(1-p)}{n}}}$

Population parameter	Point estimation	C.I for parameter	Test statistics
μ	\bar{X}	1) σ known $\bar{X} \mp Z_{\frac{\alpha}{2}} * \frac{\sigma}{\sqrt{n}}$ <hr/> 2) σ unknown: $\bar{X} \mp t_{\frac{\alpha}{2}} * \frac{S}{\sqrt{n}}$	$Z = \frac{\bar{X} - \mu_0}{\sigma/\sqrt{n}}$ <hr/> $t = \frac{\bar{X} - \mu_0}{S/\sqrt{n}}$
$\mu_1 - \mu_2$ (Independent)	$\bar{X} - \bar{Y}$	$(\bar{X} - \bar{Y}) \mp t_{\alpha/2} * S.P * \sqrt{\frac{1}{n} + \frac{1}{m}}$ The pooled variance: $S^2 = \frac{S_1^2(n-1) + S_2^2(m-1)}{n+m-2}$ $df = n + m - 2$	$t = \frac{\bar{X} - \bar{Y}}{S.P \sqrt{\frac{1}{n} + \frac{1}{m}}}$
$\mu_1 - \mu_2 = \mu_d$	\bar{d}	$\bar{d} \mp t_{\alpha/2} * \frac{s.d}{\sqrt{n}}$ $\bar{d} = \frac{\sum d_i}{n}$ $S.d = \sqrt{\frac{\sum d_i^2}{n-1} - \frac{(\sum d_i)^2}{n*(n-1)}}$	$t = \frac{\bar{d} - \mu_d}{s.d/\sqrt{n}}$
P	$\hat{P} = \frac{X}{n}$	$\hat{P} \mp Z_{\frac{\alpha}{2}} * \sqrt{\frac{\hat{P}(1-\hat{P})}{n}}$	$Z = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$ not corr.

→ If corrected :- $Z = \frac{\hat{P} - P_0 - \frac{1}{2n}}{\sqrt{\frac{P_0(1-P_0)}{n}}}$

* Determination of Sample size :-

for $\mu \Rightarrow n = \left(Z_{\alpha/2} \cdot \frac{\sigma}{E} \right)^2$

→ should be a whole no.
if fraction, round up.

for $p \Rightarrow n = \left(\frac{Z_{\alpha/2}}{E} \right)^2 \cdot \hat{p}(1-\hat{p})$

length = 2 x Error.

\hat{p} → given ✓

not given → assume $\hat{p} = 0.5$

Types of errors:

هي الأخطاء التي يحدث الوقوع بها أثناء اختبار الفرضيات. ⚠

	H_0 true \ H_1 false	H_0 false \ H_1 true
Reject H_0	Type (1) error α : significance level	$1 - \beta$ Power of the test
Accept H_0	-	Type (2) error β

* Common Confidence Values :-

confidence level.	$Z_{\alpha/2}$
90%	1.64
95%	1.96
99%	2.57

القيم كبرت لوقتنا لو حفظنا
بوقت عليك وقت الامتحان

