Exam IV

α: level of significance, preconceived or preset of

H_0: null hypothesis

H_1: alt hypothesis

μ: population mean

σ: population stan. dev.

P-value: p of getting a test statistic at least as extreme as the one representing the sample data

p : population proportion

$\hat{p}$: sample proportion

$t*$: t-value test statistic

s: sample stan. dev.

$\bar{x}$: sample mean

$z*$: z-value test statistic

Hypothesis Testing

1. Identify H_0, H_1, and the claim
   A. H_0: $\leq, =, \geq$
   B. H_1: $<, \neq, >$ ($\neq$ is two tailed. Multiply *cdf by 2 when getting p-value by cdf function)
2. Level of significance. If not give, use $\alpha = 0.05$

One population	[unit 8.2] 1 Proportion or percentage z*	[Unit 8.3] 1 Mean normally distributed population or n > 30	
3. Test Statistic z* or t* Standardized score	Stat → Tests → **5: 1-PropZTest** $p = H_0$ x n Tail of H_1 Calculate	σ NOT known. $t = 0, \sigma > 1$ Stat → Tests → **2: T-Test** $\mu = H_0$ $\bar{x}$ **Sx** n Tail of H_1 Calculate	σ known Stat → Tests →1:Z-Test $\mu = H_0$ σ $\bar{x}$ n Tail of H_1 Calculate
4. <u>p-value</u>	Distr → normalcdf(L, U, μ, σ)	Distr → 6:tcdf(L, U, df)	*mutiply 2 at beg for 2tail
Confidence	Stat → Tests → A: 1-PropZInt	Stat → Tests → 8: TInterval	
5. Decision of H_0	P-value $\leq \alpha$ reject H_0 P-value $> \alpha$ fail to reject H_0		

6. If	**And Decision is**	**6. Final Conclusion about OC**
H_0 is the Claim	Reject H_0	Sufficient evidence to warrant a rejection of OC There is significant evidence to reject the OC
	Fail to reject H_0	There isn't sufficient sample evidence to warrant a rejection of the claim We lack evidence to reject the original claim
H_1 is the Claim	Reject H_0	Sufficient sample evidence to support the claim The evidence supports the original claim
	Fail to reject H_0	There is not sufficient sample evidence to support the claim We lack evidence to support the original claim

Type I Error: α	The mistake or **rejecting** the H_0 when it is **true**
Type II Error: β	The mistake of **failing to reject** the null hypothesis when it is **false**

Inferential Statistics

E : margin of error
n_1: size sample
p_1: population proportion
$\hat{p}_1$: sample proportion
$\bar{p}$: pooled sample proportion
$\hat{q}$: complement of $\hat{p}$
x_1 : # success in sample

Requirements: $n\hat{p} \geq 4$ and $n\hat{q} \geq 5$

1. Identify $H_0 : p_1 = p_2$, H_1, and the claim
   1. $H_0 : p_1 = p_2$
   2. $H_1 : p_1 < p_2$ by a lot (Reject H_0), $p_1 \neq p_2$ (FTR H_0), $p_1 > p_2$ (FTR H_0)
2. Level of significance. If not give, use $\alpha = 0.05$ choice depends on seriousness of making type I error

Two populations	[unit 8.2] 1 Proportion or percentage INDEPENDENT	[Unit 8.3] 1 Mean normally distributed population or n > 30	
3. Test Statistic z* or t* Standardized score	Stat → Tests → 6:2-PropZTest x_1 : n_1 : x_2 : n_2 : H_1 tail: Calculate	INDEPENDENT $\mu_1 = \mu_2 = 0$ Stat → Tests →	DEPENDENT $\mu d = 0$
4. p-value			
5. Decision	P-value $\leq \alpha$ reject H_0 P-value $> \alpha$ fail to reject H_0		
Point estimate	$\hat{p}_1 - \hat{p}_2$		
Determine Critical Value z_α	$\alpha = 1 - CL \rightarrow \alpha/2$ Dist → 3: invNorm(α, μ, σ, tail)		
Margin of Error	$E = \dfrac{U - L}{2}$		
Confidence interval	Stat → Tests → B: 2-PropZInt $(\hat{p}_1 - \hat{p}_2) - E < p_1 - p_2 < (\hat{p}_1 - \hat{p}_2) + E$ $E = z_{\alpha/2}\sqrt{\dfrac{\hat{p}_1\hat{q}_1}{n_1} + \dfrac{\hat{p}_2\hat{q}_2}{n_2}}$ $\hat{p}_1 = \dfrac{x_1}{n_1}$	Stat → Tests → 0: 2-SampTInt $\bar{x}_1$: Sx_1 : n_1 : $\bar{x}_2$: Sx_2 : n_2 : CL: Pooled: Calculate:	