Sta-209, Spring 2019, Exam 3

Name _____

Normal Approximations

Statistic	Standard Error	Conditions
$\hat{p}$	$\sqrt{\frac{p(1-p)}{n}}$	$np \geq 10$ and $n(1-p) \geq 10$
$\bar{x}$	$\frac{\sigma}{\sqrt{n}}$	normal population or $n \geq 30$
$\hat{p}_1 - \hat{p}_2$	$\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$	$n_i p_i \geq 10$ and $n_i(1-p_i) \geq 10$ for $i \in \{1,2\}$
$\bar{x}_1 - \bar{x}_2$	$\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$	normal populations or $n_1 \geq 30$ and $n_2 \geq 30$
$\bar{x}_\mathrm{d}$	$\frac{\sigma_\mathrm{d}}{\sqrt{n_\mathrm{d}}}$	normal population or $n_d \geq 30$

Critical Values for the Middle P% of Various Distributions

P	80%	90%	95%	99%
z^*	1.282	1.645	1.960	2.576
$t^*(df = 8)$	1.397	1.860	2.306	3.355
$t^*(df = 9)$	1.383	1.833	2.262	3.250
$t^*(df = 10)$	1.372	1.812	2.228	3.169

The Chi-Squared Test Statistic

$$\chi^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

Measures of Association for Contingency Tables

	Event	No Event
Exposure	A	B
No Exposure	C	D

Relative Risk: $\widehat{RR} = \hat{p}_{\text{event|exposed}} / \hat{p}_{\text{event|not exposed}} = \frac{A}{A+B} / \frac{C}{C+D}$

Odds Ratio: $\widehat{OR} = \frac{\text{Odds of Event among Exposed}}{\text{Odds of Event among Not Exposed}} = \frac{A*D}{B*C}$

ANOVA

Source	*df*	Sum Sq.	Mean Sq.	F-statistic	p-value
"Model"	$d_1 - d_0$	SSM	MSM	$MSM/MSE = \frac{(SST-SSE)/(d_1-d_0)}{SSE/(n-d_1)}$	$\Pr(F_{d_1-d_0, n-d_1})$
Error	$n - d_1$	SSE	MSE		
Total	$n - d_0$	SST			