Formula Sheet for Exam III
(You may write on this side of the formula sheet. Do not write on the back.)

The mean and standard error of the sampling distribution of a sample proportion are:

$\mu_{\hat{p}}$ = **p and** $\sigma_{\hat{p}} = \sqrt{\dfrac{p(1-p)}{n}}$

The mean and standard error of the sampling distribution of a sample mean are:

$\mu_{\bar{x}}$ = **μ and** $\sigma_{\bar{x}} = \dfrac{\sigma}{\sqrt{n}}$

Formula for a z-score

$\mathbf{Z} = \dfrac{\mathbf{X - \mu}}{\boldsymbol{\sigma}}$

Confidence Interval for a proportion: $\hat{p} \pm z\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$

Confidence Level	z
.90	**1.645**
.95	**1.96**
.99	**2.58**

Steps of Hypothesis Test for Proportion:

Step 1: State Hypotheses (3 types: left, right, two tailed versions)

- The null hypothesis has the form:
- The alternative hypothesis has the form:

Step2 : Check assumptions

- The variable is categorical; The data are obtained using randomization; np≥15 and n(1-p)≥15 (Why?)

Step 3: Calculate Test Statistic

$$z* = \frac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1 - p_0)}{n}}}$$

Step 4: Determine P-value

Alternative Hypothesis	P-value	P-Value
Ha: p > p0	Right-tail probability	P(Z > z*)
Ha: p < p0	Left-tail probability	P(Z< z*)
Ha: p ≠ p0	Two-tail probability	2* P(Z< -|z*|)

Step 5: State Conclusion

If p-value ≤ α (or if p-value is less than .01 when no α is given),

➔ Reject Ho (With p-value = _______, we have sufficient evidence that (state Ha in the context of the problem).

If p-value > α (or if p-value is greater than .10 when no α is given),

➔ Fail to reject Ho (With p-value = _______, we do not have sufficient evidence that (state Ha in the context of the problem).