Formula Sheet for Exam #3

*. Confidence Interval:

① If σ is given $\Rightarrow \left(\bar{X}_n - Z_{\alpha/2}\cdot \sigma/\sqrt{n},\ \bar{X}_n + Z_{\alpha/2}\cdot \sigma/\sqrt{n}\right)$ ⇒ margin of error.

95% C.I.: $\left(\bar{X}_n - 1.96\cdot \sigma/\sqrt{n},\ \bar{X}_n + 1.96\cdot \sigma/\sqrt{n}\right)$

90% C.I. $\left(\bar{X}_n - 1.65\cdot \sigma/\sqrt{n},\ \bar{X}_n + 1.65\cdot \sigma/\sqrt{n}\right)$

99% C.I. $\left(\bar{X}_n - 2.58\cdot \sigma/\sqrt{n},\ \bar{X}_n + 2.58\cdot \sigma/\sqrt{n}\right)$.

② If S is given: $\Rightarrow \left(\bar{X}_n - t_{\alpha/2}\cdot S/\sqrt{n},\ \bar{X}_n + t_{\alpha/2}\cdot S/\sqrt{n}\right)$ ⇒ margin of error.

③ If for proportion: $\Rightarrow \left(\bar{X}_n - Z_{\alpha/2}\cdot\sqrt{\frac{\hat{p}\hat{q}}{n}},\ \bar{X}_n + Z_{\alpha/2}\cdot\sqrt{\frac{\hat{p}\hat{q}}{n}}\right)$ ⇒ margin of error.

* 5-steps for Hypothesis testing:

1: Write down the Null hypothesis H_0 and H_1.

2: Calculate the test statistics. $z = \frac{\bar{X}_n - u}{\sigma/\sqrt{n}}$, $t = \frac{\bar{X}_n - u}{S/\sqrt{n}}$

3. compute the p-value or critical value.

4: Make decision based on p-value or critical value.

5: Use human being language to summarize conclusion.

$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$ ⇑ For proportion

Note: For 2-sided test, you need to consider both sides to get the p-value.

If NOT sure, draw the bell-curve.