Confidence Interval and Sample Size Problems

Are you estimating the mean, the proportion, variance, or standard deviation?

μ

p

σ^2 or σ

YES Is σ known? **NO**

YES Is $n\hat{p}, n\hat{q} \geq 5$? **NO**

YES Population normally distributed ? **NO**

Is the population normally distributed **OR** is $n \geq 30$? **NO**

NO Is the population normally distributed **OR** is $n \geq 30$?

YES

YES

Confidence Interval

$$E = z_c \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

$$\hat{p} \pm z_c \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

with preliminary estimates of

$\hat{p}$ and $\hat{q}$

With no preliminary estimates, use

$\hat{p} = 0.5$

$\hat{q} = 0.5$

Minimum Sample Size
For the given level of confidence and E

$$n = \hat{p}\hat{q}\left(\frac{z_c}{E}\right)^2$$

Unable to continue.

Unable to continue.

Confidence Interval
Use standard normal distribution
(z-interval)

$$E = z_c \frac{\sigma}{\sqrt{n}}$$

$$\bar{x} \pm z_c \frac{\sigma}{\sqrt{n}}$$

Minimum Sample Size
For the given level of confidence and E

$$n = \left(\frac{z_c \sigma}{E}\right)^2$$

Unable to continue.

Confidence Interval
Use t-distribution

$$E = t_c \frac{s}{\sqrt{n}}$$

with

$$\bar{x} \pm t_c \frac{s}{\sqrt{n}}$$

with n - 1 degrees of freedom

Confidence Interval

$$\frac{(n-1)s^2}{\chi_R^2} < \sigma^2 < \frac{(n-1)s^2}{\chi_L^2}$$

and

$$\sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$$

with n - 1 degrees of freedom