$$s^2 = \frac{\sum_{i=1}^{N}(X_i - \bar{X})^2}{N-1}$$

$$? \overset{approx}{\sim} \mathcal{N}\left(\mu, \frac{\sigma^2}{N}\right)$$

$$? \overset{approx}{\sim} \mathcal{N}\left(p, \frac{p(1-p)}{N}\right)$$

$$\bar{X} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{N}}$$

$$\bar{X} \pm t_{\alpha/2}\frac{s}{\sqrt{N}}$$

The following is for ? distribution:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\left(\frac{1}{2}\right)\frac{(x-\mu)^2}{\sigma^2}}$$

The following is for ? distribution:

$$f(z) = \frac{1}{\sqrt{2\pi}} e^{-\left(\frac{1}{2}\right)z^2}$$