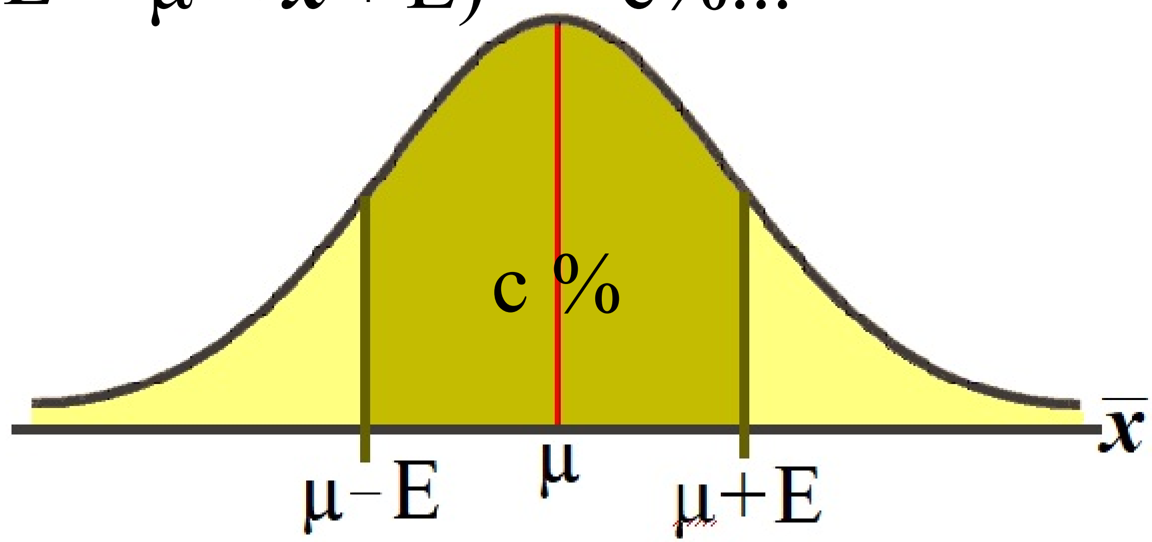
I. For a population, its mean "μ" is approximated by "$\overline{x}$" (*i.e.*, the mean of a random sample).

II. The "margin of error," is $E = |\overline{x} - \mu|$; *i.e.*, how far "$\overline{x}$" is from the true (population) mean "μ"

III. The "confidence interval" for $\overline{x}$ in a distribution of sample means is given by $\overline{x} - E < \mu < \overline{x} + E$. The confidence level is expressed by a percent, $P(\overline{x} - E < \mu < \overline{x} + E) = c\%$...



# IV. Using the standard normal distribution:

and $z = (\bar{x} - \mu_{\bar{x}}) \div \sigma_{\bar{x}}$

find the $z$-score, "$z_c$" such that...

$$P(-z_c < z < z_c) \approx c\%$$

"E" can be determined as follows,

*solve* $z_c = (\mu + E - \mu_{\bar{x}}) \div \sigma_{\bar{x}}$

multiply by "$\sigma_{\bar{x}}$", to obtain

$$z_c \times \sigma_{\bar{x}} = \mu + E - \mu_{\bar{x}}$$

then use $\sigma_{\bar{x}} = \sigma \div \sqrt{n}$ & $\mu_{\bar{x}} = \mu$

to get $z_c \times \sigma \div \sqrt{n} = \mu + E - \mu$

**VOILA!** $$\boxed{z_c \times \sigma \div \sqrt{n} = E}$$ ☞ p.363

"$z_c$" is referred to as the "critical value"

V. The confidence interval/level & margin of error model is statistically valid provided:

(1) the original/raw "$\boldsymbol{x}$" data is a normal distribution

**OR**

(2) the original/raw "$\boldsymbol{x}$" data set's distribution is not significantly skewed (*i.e.*, its graph is basically bell-shaped), and that the sampling "$\boldsymbol{\overline{x}}$" data is a random sample whose size is $n \geq 30$

VI. Examples (pp.370-372): #12,14a,18,22

HW: pp.369-373 / #1,3,5,11,13a,15a&d,19,21,23
Read pp.374-381 (section 7.2)