I. For a binomial distribution where "p" (probability of success in any one trial) is not known, it may be estimated by a sampling distribution of $\overline{p}$ using:
   (1) standard normal distribution if σ is known
   (2) t-distribution if σ is not known (not covered)

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

III. The "confidence interval" for $\overline{p}$ in a sampling distribution is given by: $\overline{p} - E < p < \overline{p} + E$, where the confidence level is expressed by a percent, $P(\overline{p} - E < p < \overline{p} + E) = c\%$...

IV. Using the standard normal distribution:

if $P(-z_c < z < z_c) \approx c\%$, then...

"E" can be determined as follows,

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

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

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

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

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

$$\boxed{z_c \times \sigma \div \sqrt{n} = E}$$

☞ p.388

"z_c" is the "critical value"

and $\sigma = \sqrt{\bar{p}(1-\bar{p})}$

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

(1) the binomial distribution is normally distributed

OR

(2) $n > 5 \div \overline{p}$ and $n > 5 \div (1 - \overline{p})$

VI. Examples (pp.395-398): #8,10a,**14ab**,22

HW: pp.395-398 / #1,3,7,9a,13ab,15,19
Read pp.401-412 (section 7.4)

I. Comparing two population means μ_1 & μ_2, or two binomial percentages p_1 & p_2, can be done provided that the:

(1) original/raw data are normally distributed;

OR

(2) original/raw data distribution is not highly skewed, and that the sampling distributions both have samples sizes no less than 30.

II. Difference of Population Means (pp.403-405):

E = critical value × standard deviation

$$\sigma = \sqrt{\frac{\sigma_1^{\,2}}{n_1} + \frac{\sigma_2^{\,2}}{n_2}} \quad \text{(provided on tests)}$$

use s_1 & s_2 if σ_1 & σ_2 unknown

Confidence interval:

$$(\bar{x}_1 - \bar{x}_2) - E < \mu_1 - \mu_2 < (\bar{x}_1 - \bar{x}_2) + E$$

III. Difference of Binomial Percentages (p.409):

E = critical value × standard deviation

$$\bar{\sigma} = \sqrt{\frac{\bar{p}_1(1-\bar{p}_1)}{n_1} + \frac{\bar{p}_2(1-\bar{p}_2)}{n_2}}$$ (provided on tests)

Confidence interval:

$$(\bar{p}_1 - \bar{p}_2) - E < p_1 - p_2 < (\bar{p}_1 - \bar{p}_2) + E$$

VI. Examples (pp.412-421): #**4**,6,10,**16b**,28c

HW: pp.412-420 / #1,5,7,11,15,21,28a

Read pp.438-449 (section 8.1)