this two-sample time: problems

next time: correlation & regression

read: LN pp. L-287-244

homework 3

(show pp. R-63-4 R-65)

has 4 problems & is due Mon 18 Jul

in class you can fill out your online evaluation

of our 7 through myuese starting
tomorrow (14 Jul) ending Fri 22 Jul

(9.42)
(10.48)

today LN pp L-186

\( \hat{SE}(\bar{y}) = \frac{s}{\sqrt{n}} = 0.2685 \)

\( \hat{SE}(\bar{y}_2) = \frac{s_2}{\sqrt{n_2}} = 0.2419 \)

\( \hat{SE}(\bar{y}_2 - \bar{y}_1) = ? \)

\( \text{can't be bigger than} \)

\( (0.2419 + 0.2685) \)

\( \text{has to be bigger than} \)

\( 0.2419 \oplus 0.2685 \)
\[ \hat{SE}(\bar{y}_2) = 0.2419 \]

\[ \hat{SE}(\bar{y}_1) = 0.2685 \]

According to the Pythagorean theorem:
\[ a^2 + b^2 = c^2 \]
\[ c = \sqrt{a^2 + b^2} \]

\[ \hat{SE}(\bar{y}_2 - \bar{y}_1) = \sqrt{\left(\hat{SE}(\bar{y}_1)\right)^2 + \left(\hat{SE}(\bar{y}_2)\right)^2} \]

\[ \hat{SE}(\bar{y}_2 - \bar{y}_1)^2 = \sqrt{(0.2685)^2 + (0.2419)^2} \]

\[ = 0.3614 \text{ days} \]

\[ \hat{SE}(\bar{y}_2 - \bar{y}_1) = \hat{SE}(\bar{y}_1 - \bar{y}_2) \]

\[ = \sqrt{\left(\frac{s_1}{\sqrt{n_1}}\right)^2 + \left(\frac{s_2}{\sqrt{n_2}}\right)^2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \]
\[
\hat{SE}(\hat{p}_1) = \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1}} = \sqrt{\frac{(0.024)(0.976)}{265}} = 0.0111 \approx 1.1\%
\]

\[
\hat{SE}(\hat{p}_2) = \sqrt{\frac{\hat{p}_2(1-\hat{p}_2)}{n_2}} = \sqrt{\frac{(0.071)(0.929)}{281}} = 0.0153 \approx 1.5\%
\]

\[
\hat{SE}(\hat{p}_1 - \hat{p}_2) = \sqrt{0.0111^2 + 0.0153^2} = 0.0186 \approx 1.9\%
\]

\[
95\% \text{ CI for } (\hat{p}_1 - \hat{p}_2) = (\hat{p}_1 - \hat{p}_2) \pm 1.96 \times \hat{SE}(\hat{p}_1 - \hat{p}_2)
\]

\[
= (0.0111 - 0.0153) \pm 1.96 \times 0.0186
\]

\[
= -0.0042 \pm 0.0365
\]

\[
= (-0.0372, 0.0108) \approx (-3.7\%, 1.1\%)
\]
\[\sqrt{\text{SE}^2(p_1 - p_2)} = \sqrt{\left(\frac{\text{SE}(p_1)}{n_1}\right)^2 + \left(\frac{\text{SE}(p_2)}{n_2}\right)^2}\]