Homework (3/13) - W.S.

A: placebo

1) $\hat{p}_A = \dfrac{239}{11{,}034} = .0217$

B: aspirin

$\hat{p}_B = \dfrac{139}{11{,}176} = .0124$

$\hat{p}_C = \dfrac{378}{22{,}210} = .017$

- randomly assigned subjects to placebo or aspirin a day.

- $11034\left(\frac{239}{11034}\right) \geq 5$, $239 \geq 5$; $11034\left(1-\frac{239}{11034}\right) \geq 5$, $10795 \geq 5$

$11176\left(\frac{139}{1176}\right) \geq 5$, $139 \geq 5$; $11176\left(1-\frac{139}{1176}\right) \geq 5$, $11037 \geq 5$

placebo group

$\dfrac{.0217}{.0124} = 1.75$ times likelier to have a heart attack than asp group

$$(.0217-.0124) \pm 1.96\sqrt{\frac{.0127(1-.0217)}{11{,}034} + \frac{.0124(1-.0124)}{11{,}176}}$$

$$(.0058, .0126)$$

95% confident the difference in prop. of people that would suffer a heart attack in a given year is .0058 - .0126 higher for those taking a placebo than those taking aspirin.

(Yes → seems effective → 0 not in interval/both pos.)

p_A = prop. that would have a heart attack in the yr. w/ placebo

p_B = " " " " w/ aspirin

$H_0: p_A = p_B$ (no diff.)

$H_a: p_A > p_B$ (asp. reduces h.a.)

$\hat{p}_C$

x_1, n_1, x_2, n_2

$$z = \frac{.0217-.0124}{\sqrt{.017(1-.017)\left(\frac{1}{11034}+\frac{1}{11{,}176}\right)}} = 5.31$$

$P_r(z > 5.31) \approx 0$ ← p-value

with a p-value ≈ 0, this is sign. at the .001 level. Reject H_0. This does provide evidence that aspirin reduces the rate of heart attack

→ experiment/meets conditions

Yes, it does allow the conc. that asp. is reducing h.a.

2) Cham L_1 Ig. L_2

1-varstats

$\bar{x}_c = 540$ $\bar{x}_I = 300$

$S_c = 299.08$ $S_I = 238.05$

$n_c = 5$ $n_I = 7$

or df = 4 (5-1), $t^*_4 = 2.776$ (chart)

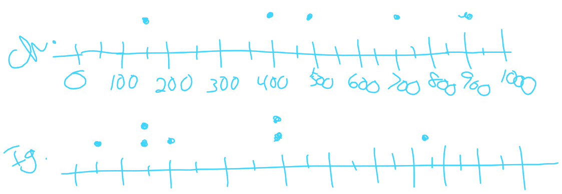
df = 7.43 (cal)

$$(540-300) \pm t^*_{7.43}\sqrt{\frac{299.08^2}{5}+\frac{238.05^2}{7}}$$

$(-136.8,\ 616.79)$

95% conf. the diff. in the avg repair cost is between \$136.80 lower for cham, to \$616.79 higher for cham. than Iguane. (0 inc ⇒ possibly no diff.)

$n_c = 5 < 30$ $n_I = 7 < 30$



* samples are very small, and the graphs appear skewed right (Ig.) not safe to assume pop. is normal. proceed w/ caution.

* not sure this counts as random samples of all ch. & Ig. either.
  - do seem like independent samples at least. (donated by company)

$H_0: \mu_c = \mu_I$

$H_a: \mu_c \neq \mu_I$

$$t = \frac{540-300}{\sqrt{\text{same as C.I.}}} = 1.49$$

$2 \cdot Pr(t > 1.49) = .1777$ (calc)

df = 7.425

or

$2 \cdot Pr(t > 1.49) = 2(.10 - .15) = .20 - .30$ (table)

df = 4

with a p-value of .1777, this is not sign. at the .05 level. Fail to reject H_0. There is not enough evid. to say the avg. repair costs differ between Ch. & Ig.

Besides, the cond. were not met, so I wouldn't feel comfortable making concl. anyway.

24-1

	M	T	W	Th	F	Sa	Su	
O	17	26	22	23	19	15	25	147
E	21	21	21	21	21	21	21	147
$\frac{(O-E)^2}{E}$	.76							

$\frac{1}{7}(147)$

4.857 = χ^2

$\sum \frac{(O-E)^2}{E}$

H_0: Each day of the week is = likely to be a birthday. ($\frac{1}{7}$)

H_a: at least one day is not = likely

- exp. values ≥ 5 (all 21)
- treat as SRS of births

df = 7 − 1 = 6

$\chi^2 = \frac{(17-21)^2}{21} + \frac{(26-21)^2}{21} + \cdots + \frac{(25-21)^2}{21}$

$\chi^2 = 4.857$

$P(\chi^2 > 4.857) = .5623$