Homework 5

7.71 - Sadness & Spending

(a) The use of t-procedures could be appropriate because there is no apparent skewness/outliers. However, we don't know if it's normal which we should keep in mind

(b)

	Sample Size	Mean	Standard Dev
Neutral	14	0.571	0.73
Sad	17	2.12	1.24

(c) μ_1 = mean of Neutral Group $\}$ $H_0: \mu_1 = \mu_2$
μ_2 = mean of Sad Group $\}$ $H_a: \mu_1 \neq \mu_2$

(d) $\alpha = 0.05$ level $\rightarrow$ Test Stat: $\dfrac{0.571 - 2.118}{\sqrt{\left(\frac{0.73^2}{14}\right) - \left(\frac{1.24^2}{17}\right)}} = -4.3$

degrees of freedom = 26

p-value = 0.0001 [We see a big difference in mean and there p-val is much smaller than sig-level 0.05 Therefore, reject H_0 & accept H_a.]

(e) 95% Confidence Int,
$\rightarrow (0.571 - 2.12) \pm \sqrt{\frac{(0.73)^2}{14} - \frac{(1.24)^2}{17}} * t_{\frac{\alpha}{2}} = (-2.285, -.808)$

7.89 - Breast-Feeding vs Baby Formula

(a) μ_1 = breast-feed group $\}$ $H_0: \mu_1 = \mu_2$ $\quad$ $s_{comb} = \sqrt{\dfrac{22*(1.7)^2 + 18*3.24}{40}}$
μ_2 = baby formula group $\}$ $H_a: \mu_1 > \mu_2$ $\quad$ $= 1.746$

We get p-val = 0.053 so based on the significant level there's not a higher level if the level is 0.05. H_0 is not rejected.
$\leftarrow \{ 1.66 = t = \dfrac{13.3 - 12.4}{1.746 \cdot \sqrt{\frac{1}{23} + \frac{1}{19}}}$

(b) $(-0.202, 2.002)$

(c) We assume the samples involved are normal and simple random samples (SRS).

7.102 - Comparison of Standard Derivations

(a) $F = 2.6$

(b) $F(15, 10, 0.05) = 2.845$

(c) The 2 population standard deviations are equal

7.122 – Two-sample t test

(a) $\bar{x}_1 = 49.69$, $s_1 = 2.318$, $\bar{x}_2 = 50.545$, $s_2 = 1.924$

degrees of freedom $= 17$, $t = -0.9$, p-val $= 0.3831$

(b) ~~p-val = 0.3834~~ $\bar{d} = -0.853$, $s = 1.2691$, $t = -2.13$

p-val $= 0.0625$

(c) The p-vals, t-stat are different resulting in accidental acceptance / rejection of H_0

8.71 – Gender Bias in Textbook

(a) Proportion$_{female} = 0.8$, $SE_{female} = 0.052$

Proportion$_{male} = 0.39$, $SE_{male} = 0.0425$

(b) 90% conf $\rightarrow$ $(0.2960, 0.5161)$

The mean difference of male to female is between $0.2960 - 0.5161$.

(c) $H_0 : prop_f = prop_{male}$, $p = 0.5101$

Standard Error $= 0.0778$

$z = \dfrac{prop_{female} - prop_{male}}{0.0778} = 5.217$

We reject null hypo H_0 because there is a big difference $P(z > 5.217) \approx 0$.