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7.71

a) Neutral: some of the points are outside the control lines, so it is approximately normal. t values should be used because $n < 30$ and σ unknown

Sad : points inside control lines so it is normal. T should be used because $n < 30$ and σ unknown

b)

	n	mean	standard deviation
neutral	14	0.571	0.730
sad	17	2.118	1.244

c) null : H_0 : there is not a significant difference in the mean price of the waters

$H_0: \mu_1 = \mu_2$ or $\mu_1 - \mu_2 = 0$

alt: H_A: there is a significant difference in the mean price of the waters

$H_A: \mu_1 \neq \mu_2$ or $\mu_1 - \mu_2 \neq 0$

d) $n_1 = 14$ $\quad$ $\alpha = 0.05$ $\quad$ $n_2 = 17$

$\bar{x}_1 = 0.571$ $\quad$ $\bar{x}_2 = 2.118$

$s_1 = 0.730$ $\quad$ $s_2 = 1.244$

$$t = \frac{0.571 - 2.118}{\sqrt{\frac{(0.730)^2}{14} - \frac{(1.244)^2}{17}}} = \boxed{-4.306 = t}$$

$\boxed{df = 13}$

$\boxed{p \text{ value} = 0}$

p-value $< \alpha$, so reject H_0

conclusion: There is sufficient sample evidence to warrant the conclusion that there is a significant difference between the means

$t = 2.16$ for df at $\alpha = 0.05$

e) $(0.571 - 2.118) \pm (2.16)\sqrt{\frac{(0.730)^2}{14} - \frac{(1.244)^2}{17}}$

$= -1.547 \pm 0.776$

$= -2.323 \leq \mu_1 - \mu_2 \leq -0.771$

I am 95% confident The true difference in means for these two groups is between 2.323 and 0.771

7.89 a) $H_0: \mu_B = \mu_F$ hemoglobin in breast fed = formula

$H_A: \mu_B > \mu_F$ hemoglobin in breast fed > formula

$t = \frac{13.3 - 12.4}{\sqrt{\frac{1.7^2}{23} + \frac{1.8^2}{19}}} = 1.654$ p-value = 0.053

$0.053 > 0.05$, so FTR H_0

conclusion: There is not significant evidence to support the claim the hemoglobin in breast fed is greater than formula.

b) $t = 2.101$ for df = 18 at 95% conf.

$(13.3 - 12.4) \pm 2.101\sqrt{\frac{1.7^2}{23} + \frac{1.8^2}{19}}$

$= -0.2434 \leq \mu_B - \mu_F \leq 2.0434$

I am 95% confident The true difference in means for these two groups is between 0.2434 and 2.0434

c) The procedures are only valid when the samples are independent from the population

$H_0: \sigma_1 = \sigma_2$
$H_A: \sigma_1 \neq \sigma_2$

7.102 a) TS $\boxed{F = 0.38}$

b) $F_{critical} = (n_1 - 1, n_2 - 1)$
$= (10, 15) = \boxed{2.54}$

c) F value is not within critical region, so fail to reject Ho

There is not sufficient evidence to suggest that the standard deviations are equal

7.122 a) $\bar{x}_1 = 49.69$ $\bar{x}_2 = 50.55$
$s_1 = 2.32$ $s_2 = 1.92$
$s_1^2 = 5.38$ $s_2^2 = 3.686$

TS = $t = -0.9$ p-val $= 0.383$ df = 9

b) mean $= -0.853$ $s^2 = 1.611$
$t = -2.13$ $p = 0.062$ df = 9

c) the results show no difference between the population means

8.7 a) girls: $p_g = \frac{48}{60} = \boxed{0.80}$

standard error $= \sqrt{\frac{0.8(1-0.8)}{60}} = \boxed{0.05164}$

boys: $p_b = \frac{52}{132} = \boxed{0.394}$

standard error: $\sqrt{\frac{(0.394)(1-0.394)}{132}} = \boxed{0.0425}$

b) $z = 1.96$

$$(0.8 - 0.394) \pm 1.96 \sqrt{\frac{(0.8)(1-0.8)}{60} + \frac{(0.394)(1-0.394)}{132}}$$

$= 0.4061 \pm 0.131 = 0.275 \le p_g - p_b \le 0.5372$

I am 90% confident the true difference between the proportions is between 0.275 and 0.5372

c) $H_0: p_1 = p_2$

$H_A: p_1 \neq p_2$

$\hat{p} = \frac{X_1 + X_2}{n_1 + n_2} = 0.52$

$$z = \frac{(0.8 - 0.394) - 0}{\sqrt{0.52(1-0.52)\left(\frac{1}{60} + \frac{1}{32}\right)}} \approx 5.22$$

5.22 is in rejection region so reject H_0

conclussion: there is a difference in the proportions of the two