College Prep Stats
Review for Chapter 9 Test

1) [Ans] Trail = SRS, Independent 2 treatment groups,

$x_1 = 67 > 5$, $x_2 = 60 > 5$, $n_1 - x_1 = 73 - 67 = 6 > 5$, $n_2 - x_2 = 83 - 60 = 23 > 5$

$H_0: \quad p_1 = p_2 \qquad H_1: \quad p_1 > p_2$ (original claim)

$\alpha = 0.01$

$$\bar{p} = \frac{67+60}{73+83} = 0.814103, \qquad \bar{q} = 0.185897$$

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} = \frac{\frac{67}{73} - \frac{60}{83}}{\sqrt{0.814103 * 0.185897\left(\frac{1}{73}+\frac{1}{83}\right)}} = 3.1226$$

P-Value = 0.0008965 < 0.01 Reject H_0

The sample data support the claim that treatment with open carpal tunnel release surgery resulted in better outcomes than treatment with wrist splinting for patients with CTS (carpal tunnel syndrome).

2) [Ans] Study = SRS, cocaine users and non-cocaine user are independent

$n_1 = 190 > 30$, $n_2 = 186 > 30$

$H_0: \quad \mu_1 = \mu_2 \qquad H_1: \quad \mu_1 < \mu_2$ (original claim)

$\alpha = 0.05$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}} = \frac{7.3-8.2}{\sqrt{\frac{3^2}{190}+\frac{3^2}{186}}} = -2.9084$$

P-Value = 0.0019 < 0.05 Reject H_0

The sample data support the claim that prenatal cocaine exposure is associated with lower scores of four-year-old children on the test of object assembly.

3) [Ans] "Student" = SRS, 2 paired dependent population, difference of the yields follows Normal Distribution

$H_0: \quad \mu_d = 0$ (original claim) $\qquad H_1: \quad \mu_d \neq 0$

$\alpha = 0.05$

$$t = \frac{\bar{d} - \mu_d}{\frac{s_d}{\sqrt{n}}} = \frac{-1.090909 - 0}{\frac{2.361866}{\sqrt{11}}} = -1.531898$$

P-Value = 0.1565 > 0.05 Fail to reject H_0

There is not sufficient sample evidence to warrant rejection of the claim that there is no difference between the yields from two types of the seed.

4) [Ans] 13200 * 26.7% = 3524.4,

3525/13200 = 26.70454545%, off 26.7% by 0.00004545,

3524/13200 = 26.6969697%, off 26.7% by 0.000030303, $x_1 = 3524 > 5$

13433 * 29% = 3895.57,

3895/13433 = 28.995757%, off 29% by 0.0000424328147,

3896/13433 = 29.00320107%, off 29% by 0.00003201072, $x_2 = 3896 > 5$

$n_1 - x_1 = 13200 - 3524 = 9676 > 5$, $n_2 - x_2 = 13433 - 3896 = 9537 > 5$

"Journal of the American Medical Association" = SRS, 2 independent populations

$H_0: \quad p_1 = p_2$ (original claim) $\qquad H_1: \quad p_1 \neq p_2$

$\alpha = 0.01$

$$\bar{p} = \frac{3524 + 3896}{13200 + 13433} = 0.278602, \qquad \bar{q} = 0.721398$$

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{\frac{3524}{13200} - \frac{3896}{13433}}{\sqrt{0.278602 * 0.721398\left(\frac{1}{13200} + \frac{1}{13433}\right)}} = -4.1975$$

P-Value = 0.000027 < 0.01 Reject H_0

There is sufficient evidence to warrant rejection of the claim that the acceptance rate is the same with or without blinding.

5) [Ans] SRS, 2 independent books, normally distributed

$H_0: \quad \mu_1 = \mu_2 \qquad H_1: \quad \mu_1 > \mu_2$ (original claim)

$\alpha = 0.02$

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{80.75 - 66.15}{\sqrt{\frac{4.681^2}{12} + \frac{7.858^2}{12}}} = 5.5295$$

P-Value = 0.0000152 < 0.02 Reject H_0

There is sufficient sample evidence to support the claim that “Harry Potter and the Sorcerer’s Stone” is easier to read than “War and Peace”.

6) [Ans] SRS, 2 dependent pair data, normally distribution

$H_0: \quad \mu_d = 0 \qquad H_1: \quad \mu_d < 0$ (original claim)

$\alpha = 0.01$

$$t = \frac{\overline{d} - \mu_d}{\frac{s_d}{\sqrt{n}}} = \frac{-9.8889 - 0}{\frac{9.4001}{\sqrt{12}}} = -3.1560$$

P-Value = 0.0067 < 0.01 Reject H_0

The sample data support the claim that the diet is effective in helping people lose weight.