Name _____

1a.) H_0 : $\mu_d = 0$ H_1 : $\mu_d < 0$ t = -2.827 (8)

$P-value$ $.01 < p < .025$ Conclusion p-value $> \alpha$, fail to reject H_0 & fail to claim H_1. The prep course in not effective.

b.) $t_{\alpha/2}$ = 2.896 CI : (-231.69, 2.81)

Conclusion: We are 98% confident the interval (-231.69, 2.81) contains the pop. mean difference in SAT scores. 0 is in CI, no difference. (10)

2a.) r = .866 Linear? Yes CV: .666

b.) $\hat{y} = 15.55 + 1.25x$ c.) 28.3 (10)

3a.) r = -.475 Linear? NO CV: .632

b.) ——— c.) 59.3 (8)

4a.) H_0 : $p_1 = p_2$ H_1 : $p_1 > p_2$ z = 4.13

$P-value$ .0001 Conclusion P-value $< \alpha$, reject H_0 & claim H_1. Prop. of student who rent calculators is higher at college than university. (8)

b.) $z_{\alpha/2}$ = 1.645 CI : (.155, .345)

Conclusion: We are 90% confident the interval (.155, .345) contains the pop. difference in prop. of calculator renters. 0 is not in CI, there is a difference. (10)

5a.) H_0 : $\mu_1 = \mu_2$ H_1 : $\mu_1 \neq \mu_2$ t = 1.12

$P-value$ $> .20$ Conclusion P-value $> \alpha$, fail to reject H_0 & fail to claim H_1. The gas stations do not have different prices. (8)

b.) $t_{\alpha/2}$ = 3.499 CI : (-.445, .865)

Conclusion: We are 99% confident the interval (-.445, .865) contains the difference in gas prices. 0 is in CI, there is no difference. (10)

6.) H_0 : $p = .75$ H_1 : $p \neq .75$ z = 1.63

$P-value$ .1032 Conclusion p-value $> \alpha$, fail to reject H_0 & fail to claim H_1. We keep the claim that 75% eat dessert. (9)

7.) H_0 : $\mu = 30$ H_1 : $\mu > 30$ t = 6.003

$P-value$ $< .005$ Conclusion p-value $< \alpha$, reject H_0 & claim H_1. The mean wait time is above 30 min. (10)

8.) H_0 : $\sigma = 10$ H_1 : $\sigma \neq 10$ χ^2 = 42.59

$P-value$ $< .01$ Conclusion p-value $< \alpha$, reject H_0 & claim H_1. The standard deviation is not 10. (9)

-100 100 -200 -120 -60 -330 -30 -90 -200

$\bar{d} = -114.44 \quad s_d = 121.46$

$t = \frac{-114.44}{\left(\frac{121.46}{\sqrt{9}}\right)} = -2.827 \quad df = 8$

b.) .01 | .98 | .01 (.02) $E = 2.896 \cdot \frac{121.46}{\sqrt{9}} = 117.25$

$-114.44 - 117.25 < \mu_d < -114.44 + 117.25$

(2a.) $\Sigma x = 73.8 \quad \Sigma x^2 = 1376.22 \quad n = 9 \quad \bar{y} = 25.77$
$\Sigma y = 231.9 \quad \Sigma y^2 = 7573.03 \quad \Sigma xy = 2862.4$

$r = \frac{9 \cdot 2862.4 - 73.8 \cdot 231.9}{\sqrt{9 \cdot 1376.22 - 73.8^2}\sqrt{9 \cdot 7573.03 - 231.9^2}} = .866$

b.) $b_0 = \frac{231.9 \cdot 1376.22 - 73.8 \cdot 2862.4}{9 \cdot 1376.22 - 73.8^2} = 15.55$

$b_1 = \frac{9 \cdot 2862.4 - 73.8 \cdot 231.9}{9 \cdot 1376.22 - 73.8^2} = 1.25$

$\hat{y} = 15.55 + 1.25x$

c.) $\hat{y} = 15.55 + 1.25(10.2) = 28.3$

(3.) a.) $\Sigma x = 785 \quad \Sigma x^2 = 61807 \quad n = 10 \quad \bar{y} = 59.3$
$\Sigma y = 593 \quad \Sigma y^2 = 35239 \quad \Sigma xy = 46495$

a.) $r = \frac{10 \cdot 46495 - 785 \cdot 593}{\sqrt{10 \cdot 61807 - 785^2}\sqrt{10 \cdot 35239 - 593^2}} = -.475$

(4.) $\hat{p}_1 = \frac{86}{120} = .717 \quad \hat{q}_1 = .283$
$\hat{p}_2 = \frac{70}{150} = .467 \quad \hat{q}_2 = .533$

$\bar{p} = \frac{86 + 70}{120 + 150} = .578$
$\bar{q} = .422$

a.) $z = \frac{(.717 - .467)}{\sqrt{\frac{.578 \times .422}{120} + \frac{.578 \times .422}{150}}} = 4.13$

b.) .05 | .90 | .05 $E = 1.645\sqrt{\frac{.717 \times .283}{120} + \frac{.467 \times .533}{150}} = .095$

$(.717-.467)-.095 < p_1-p_2 < (.717-.467)+.095$

$.155 < p_1-p_2 < .345$

(6.) $\hat{p} = \frac{160}{200} = .8$

$$z = \frac{.8-.75}{\sqrt{\frac{.75*.25}{200}}} = 1.63$$

P-value $= 2(1-.9484) = .1032$

(7.) $\bar{x} = 59.07 \quad s = 18.12 \quad n = 14$

$$t = \frac{59.07-30}{\left(\frac{18.12}{\sqrt{14}}\right)} = 6.003 \quad df = 13$$

(8.) $\chi^2 = \frac{(14-1)\cdot 18.12^2}{10^2} = 42.68 \quad df = 13$

P-value $< 2(.005) = .01$

(9.) $\bar{x}_1 = 3.67 \quad s_1 = .303 \quad n_1 = 8$

$\bar{x}_2 = 3.46 \quad s_2 = .486 \quad n_2 = 10$

a.) $$t = \frac{(3.67-3.46)}{\sqrt{\frac{.303^2}{8}+\frac{.486^2}{10}}} = 1.12 \quad df = 7$$

b.) 

.01 in 2 tails $df = 7$

$$E = 3.499\sqrt{\frac{.303^2}{8}+\frac{.486^2}{10}} = .655$$

$(3.67-3.46)-.655 < \mu_1-\mu_2 < (3.67-3.46)+.655$