

$$1. (a) H_0 : \mu = 50$$

$$H_A : \mu > 50$$

$$(b) \bar{x} = 53.4 \quad \alpha = 0.01$$

$$s = 14$$

$$n = 49$$

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{53.4 - 50}{\frac{14}{\sqrt{49}}}$$

$$= 1.7$$

$$p\text{-value} = 0.0478$$

Fail to reject H_0 since $p\text{-value} > \alpha$. There is not enough evidence to conclude that the her seniors score higher than the state average on a test on Mechanical Ability.

$$2. (a) H_0 : \mu = 77$$

$$H_A : \mu \neq 77$$

$$(b) \bar{x} = 79.8 \quad \alpha = 0.05$$

$$s = 7$$

$$n = 30$$

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{79.8 - 77}{\frac{7}{\sqrt{30}}} = 2.1909$$

$$p\text{-value} = 0.0366$$

Reject H_0 since $p\text{-value} < \alpha$. There is enough evidence to conclude that the statewide average arithmetic test score is not equal to 77.

$$3. (a) H_0: \mu = 1000$$

$$H_A: \mu > 1000$$

$$(b) \bar{X} = 1096$$

$$\alpha = 0.05$$

$$s = 66.552879$$

$$n = 15$$

$$t = \frac{1096 - 1000}{\frac{66.552879}{\sqrt{15}}} = 5.5866$$

$$P\text{-value} = 0.000034$$

Reject H_0 since $p\text{-value} < \alpha$. There is enough evidence to conclude that NSU students score higher on the SAT than the general population.

$$(c) CI = \bar{X} \pm t_{\alpha/2} \left(\frac{s}{\sqrt{n}} \right)$$

$$\bar{X} = 1096$$

$$s = 66.552879$$

$$n = 15$$

$$t_{\alpha/2} = 2.145$$

$$= 1096 \pm 2.145 \left(\frac{66.552879}{\sqrt{15}} \right)$$

$$= 1096 \pm 2.49$$

$$= 1096 \pm 36.859$$

$$= (1059.14, 1132.86)$$

We are 95% confident that the true population mean lies between 1059.14 and 1132.86.

$$4. (a) H_0: \mu_1 - \mu_2 = 0$$

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

(b) $\bar{X}_1$ = sample mean for levels of stress for students in psychology program

$\bar{X}_2$ = sample mean for levels of stress for students in business program

$$\bar{X}_2 = 4.16667 \quad \text{standard error} = 0.9309$$

$$\bar{X}_1 = 3.16667$$

$$S_2 = 2.48328$$

$$S_1 = 2.63944$$

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\text{std. error}}$$

$$= \frac{(-4.16667 + 3.16667) - 0}{0.9309}$$

$$= -1.0742$$

$$p\text{-value} = 0.3318$$

Fail to Reject H_0 . There is not enough evidence to ~~can~~ show that there is a difference between ~~psych~~ the levels of stress for students in business and psychology program

(c) 95% confidence interval

$$CI = (\bar{X}_1 - \bar{X}_2) \pm t_c (\text{std. error})$$

$$= -1 \pm 2.571 \times 0.9309$$

$$= -1 \pm 2.3935$$

$$= (-3.393, 1.3935)$$

99% confidence interval

$$CI = -1 \pm 4.032 \times 0.9309$$

$$= -1 \pm 3.7534$$

$$= (-4.7534, 2.7534)$$