

$$1. \quad t = 1.79$$

$$n = 35$$

$$p\text{-value} = 0.0824$$

2. Yes. Since the interval does not contain 0, we reject H_0 and conclude that there is evidence that the true survival rate is lower for accidents whose drivers were impaired.

3. 95%

$$4. (a) \quad p\text{-value} = 0.0049$$

(b) Yes. The p -value is less than 0.01, therefore, the null hypothesis is rejected.

$$5. \quad H_0: p = 0.08$$

$$H_1: p > 0.08$$

$$x = 47, n = 500, \alpha = 0.05 \quad \hat{p} = \frac{47}{500} = 0.094$$

$$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{0.094 - 0.08}{\sqrt{\frac{0.08(1-0.08)}{500}}}$$

$$Z = 1.15$$

$$p\text{-value} = 0.1251$$

Fail to reject H_0 since the p -value is greater than α .
There is no evidence to conclude that more than 8% of the potatoes have 'blemishes'.
The producer should not send away the truck for a new one.

$$6. \quad H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 > \mu_2$$

$$n_1 = 10$$

$$\bar{x}_1 = 52.9$$

$$s_1 = 14.9403$$

$$n_2 = 10$$

$$\bar{x}_2 = 46.7$$

$$s_2 = 12.3922$$

$$t = \frac{52.9 - 46.7}{\sqrt{\frac{14.9403^2}{10} + \frac{12.3922^2}{10}}} = 1.01$$

$$p\text{-value} = 0.1632$$

~~Reject H_0~~

Fail to reject H_0 since p-value is greater than α . This data does not support the claim that, on average, high school students at this school throw a baseball farther than a softball.

7. $\bar{x} = 179.6$ $\mu = 180$ $H_0: \mu = 180$
 $s = 1.3$ $H_1: \mu < 180$
 $n = 40$

$$z = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{179.6 - 180}{\frac{1.3}{\sqrt{40}}} = -1.95$$

$$p\text{-value} = 0.0258$$

Reject H_0 since p-value is less than α . There is evidence to conclude that the machine is underfilling the bottles.

8. Part 1

$$\begin{aligned} n_1 &= 764 \\ \bar{x}_1 &= 38.97 \\ s_1 &= 13.13 \end{aligned}$$

$$\begin{aligned} n_2 &= 1501 \\ \bar{x}_2 &= 41.91 \\ s_2 &= 14.35 \end{aligned}$$

$$\begin{aligned} H_0: \mu_1 &= \mu_2 \\ H_1: \mu_1 &\neq \mu_2 \end{aligned}$$

$$z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{38.97 - 41.91}{\sqrt{\frac{13.13^2}{764} + \frac{14.35^2}{1501}}} = -4.88$$

$$p\text{-value} = 0.0001$$

Reject H_0 since the p-value is less than α . There is enough evidence to say that there is a difference in the true mean number of work hours per week for Americans in 1975 and 2014.

Part 2.

$$(a) (\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$$(38.97 - 41.91) \pm 1.18$$

$$= (-4.121, -1.759)$$

The confidence interval does not contain a 0; therefore, we reject H_0 .

$$9. \quad n_1 = 160 \quad n_2 = 261$$

$$x_1 = 64 \quad x_2 = 89$$

$$H_0: p_1 - p_2 \geq 0$$

$$H_1: p_1 - p_2 < 0$$

$$\hat{p}_1 = 0.4, \hat{p}_2 = 0.341$$

$$Z = \frac{0.4 - 0.341}{\sqrt{\frac{0.4(1-0.4)}{160} + \frac{0.341(1-0.341)}{261}}}$$

$$= 1.22$$

$$p\text{-value} = 0.2218$$

There is no ~~different~~ evidence that there is a difference in the preference for natural trees between urban and rural households.

$$10. \quad H_0: p = 0.8$$

$$H_1: p < 0.8$$

$$\mu = 0.8 \quad n = 100$$

$$\sigma = 0.4$$

$$CI = p \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 0.8 \pm 1.96 \left(\frac{0.4}{\sqrt{100}} \right)$$

$$CI = 0.8 \pm 0.0784$$

$$= (0.7216, 0.8784)$$