...m is 19.8%

HW5

9.2 $\sigma = 40$ hours $\quad \alpha = 0.04$

$n = 30$ bulbs

$\bar{x} = 780$

Find a 96% confidence interval for the population mean of all bulbs produced by firm:

$$\bar{x} - z_{\alpha/2}\frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + z_{\frac{\alpha}{2}}\frac{\sigma}{\sqrt{n}}$$

$$780 - 2.05\left(\frac{40}{\sqrt{30}}\right) < \mu < 780 + 2.05\left(\frac{40}{\sqrt{30}}\right)$$

$$765.00 < \mu < 794.998$$

The 96% confidendence interval for the population mean of all bulbs produced by firm is (765.00, 795.00)

9.8 $\alpha = 0.05$

$\sigma = 40$ sec

$(\mu - 15, \mu + 15)$

$$-15 < \mu - \bar{x} < 15$$

$$15 = z_{\alpha/2}\frac{\sigma}{\sqrt{n}} \Rightarrow n = \left(\frac{z_{\frac{\alpha}{2}}\sigma}{15}\right)^2 = 27.32$$

there will need to be 28 samples in order to be 95% confident her sample mean will be within 15 seconds of the true mean.

9.12 $n=10$ $\quad z_{\alpha/2}=2.575$ $\quad \bar{X} \pm 12.22 = (217.78, 242.22)$

$\bar{X}=230$

$\sigma=15$ $\quad z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)=12.22$

$\alpha=0.01$

The 99% confidence interval for the true mean calorie content for the brand is (217.78, 242.22)

9.14 $n=15$

$\bar{x}=3.78$ $\quad 3.78 \pm 1.96\left(\frac{0.937}{\sqrt{15}}\right)$ ← b/c population standard deviation

$\sigma=0.937$

$\alpha=0.05$

$z_{\alpha/2}=1.96$

The 95% confidence interval for the true mean is (3.31, 4.25)

9.54 $n=500$

$q=15/500=0.03 \Rightarrow 0.97 \pm 1.64\sqrt{\frac{0.97(0.03)}{500}}$

$p=0.97$

The 90% confidence interval for the proportion of mp3 that pass all tests is (.957, .983)

9.72 $n=20$ $\quad \frac{(n-1)s^2}{\chi^2_{\alpha/2}} < \sigma^2 < \frac{(n-1)s^2}{\chi^2_{1-\alpha/2}}$

$\bar{x}=72$

$s^2=16$

$s=4$

$\chi^2_{1-\alpha/2}=7.63$ $\quad \frac{19(16)}{36.19} < \sigma^2 < \frac{19(16)}{7.63}$

$\chi^2_{\alpha/2}=36.19$

$8.40 < \sigma^2 < 39.84$

The 98% confidence interval for σ^2 is (8.40, 39.84)

$z = 1.87$ when $\mu = 10$

HW5

10.20 $n = 64$

$\bar{x} = 5.23$

$\sigma = 0.24$

$H_0 \Rightarrow \mu = 5.5$

$\alpha = 0.05 \Rightarrow z_{\alpha/2} = 1.96$

$$z = \frac{5.23 - 5.5}{0.24/8} = -9$$

$$-1.96 < z < 1.96 \rightarrow -1.96 \cancel{<} -9 < 1.96$$

We reject H_0 with a significance with 0.05. The mean weight of the cheddar bags is less than 5.5.

10.24 $\mu = 162.5$

$\sigma = 6.9$

$n = 50$

$\bar{x} = 165.2$

$z_{\alpha/2} = 1.96$

$$z = \frac{165.2 - 162.5}{6.9/\sqrt{50}} = 2.766$$

$z > z_{\frac{\alpha}{2}} \Rightarrow$ Reject H_0

$P(|z| > 2.766) = 2P(z > 2.766) = 2(0.0028) = 0.0056$

It is concluded p-value is less then any relevant significance level (0.0056) & z exceeds $z_{\alpha/2}$, therefore we reject H_0 & conclude the average height of freshman girls has changed from 165.2 cm.

10.26 $n = 20$

$H_0 = \mu = 220$ $\quad H_1 > 220$

$\bar{x} = 244$

$s = 24.5$

$\alpha = 0.05$ $\quad t_{\alpha,19} = 1.73$

$$t = \frac{244 - 220}{24.5/\sqrt{20}} = \frac{24\sqrt{20}}{24.5} = 4.38$$

$\Rightarrow t_{\alpha,19} < t \Rightarrow H_0$ rejected

It is concluded that the average sodium content for a single serving of cereal exceeds 220mg

162 9 $\cancel{12}$ 18 14 $\cancel{12}$ 14 $\cancel{12}$ 10 16 11 9 11 13 11 13 15 13 14

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$H_0 = M = 12$ $H_a = M \neq 12$

$\alpha = 0.02$

$x \geq \frac{n}{2} \Rightarrow 9 \geq \frac{15}{2} \Rightarrow 9 > 7.5$ ✓

$$\Rightarrow 2P(X \geq 9 \mid p = .5) = 2\left(1 - \sum_{x=0}^{8} b(x; 15, \tfrac{1}{2})\right)$$

$$= 0.30 > 0.02$$

The instructor's claim that the median time required till the students' solo is 12 hours is true, we fail to reject H_0.