Problem Set 8-Solutions

Chapter 9

1. a. H_0: $\mu \leq 600$ Manager's claim.

   H_a: $\mu > 600$

   b. We are not able to conclude that the manager's claim is wrong.

   c. The manager's claim can be rejected. We can conclude that $\mu > 600$.

4. a. H_0: $\mu \geq 220$

   H_a: $\mu < 220$ Research hypothesis to see if mean cost is less than \$220.

   b. We are unable to conclude that the new method reduces costs.

   c. Conclude $\mu < 220$. Consider implementing the new method based on the conclusion that it lowers the mean cost per hour.

9. a. $z = \dfrac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} = \dfrac{19.4 - 20}{2 / \sqrt{50}} = -2.12$

   b. Area = .4830

   p-value = .5000 - .4830 = .0170

   c. *p*-value ≤ .05, reject H_0

   d. Reject H_0 if $z \leq -1.645$

   -2.12 ≤ -1.645, reject H_0

10. a. $z = \dfrac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} = \dfrac{26.4 - 25}{6 / \sqrt{40}} = 1.48$

    b. Area = .4306

    p-value = .5000 - .4306 = .0694

    c. *p*-value > .01, do not reject H_0

    d. Reject H_0 if $z \geq 2.33$

1.48 < 2.33, do not reject H_0

16. a. H_0: $\mu \leq 895$

H_a: $\mu > 895$

b. $z = \dfrac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} = \dfrac{915 - 895}{225 / \sqrt{180}} = 1.19$

Area = .3830

p-value = .5000 - .3830 = .1170

c. Do not reject H_0. We cannot conclude the rental rates have increased.

d. Recommend withholding judgment and collecting more data on apartment rental rates before drawing a final conclusion.

18. a. H_0: $\mu = 4.1$

H_a: $\mu \neq 4.1$

b. $z = \dfrac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} = \dfrac{3.4 - 4.1}{2 / \sqrt{40}} = -2.21$

p-value = 2(.5000 - .4864) = .0272

c. *p*-value = .0272 < .05

Reject H_0 and conclude that the return for Mid-Cap Growth Funds differs significantly form that for U.S. Diversified funds.

20. a. H_0: $\mu \geq 181{,}900$

H_a: $\mu < 181{,}900$

b. $z = \dfrac{\bar{x} - \mu}{\sigma / \sqrt{n}} = \dfrac{166{,}400 - 181{,}900}{33{,}500 / \sqrt{40}} = -2.93$

c. *p*-value = .5000 - .4983 = .0017

d. *p*-value ≤ .01; reject H_0. Conclude mean selling price in South is less than the national mean selling price.

21. a. $H_0: \mu \leq 15$

$H_a: \mu > 15$

b. $z = \dfrac{\bar{x} - \mu}{\sigma / \sqrt{n}} = \dfrac{17 - 15}{4 / \sqrt{35}} = 2.96$

c. p-value = .5000 - .4985 = .0015

d. p-value $\leq$ .01; reject H_0; the premium rate should be charged.

22. a. $H_0: \mu = 8$

$H_a: \mu \neq 8$

b. $z = \dfrac{\bar{x} - \mu_0}{\sigma / \sqrt{n}} = \dfrac{8.4 - 8}{3.2 / \sqrt{120}} = 1.37$

p-value = 2(.5000 - .4147) = .1706

c. Do not reject H_0. Cannot conclude that the population mean waiting time differs from 8 minutes.

d. $\bar{x} \pm z_{.025}(\sigma / \sqrt{n})$

$8.4 \pm 1.96\,(3.2 / \sqrt{120})$

$8.4 \pm .57$ (7.83 to 8.97)

Yes; $\mu = 8$ is in the interval. Do not reject H_0.