Date

Name:- Hamza Zafar
class:- BSE-3B
Enroll:- 02-131212-079
Reg:- 79322

"Assignment 04"

"Probability & statistics"

Q 10.19

$\bar{x} = 38$ $\quad \sigma = 5.8$ $\quad \alpha = 0.4$

$\mu = 40$ $\quad n = 64$

$H_0 : \mu = 40$ months, $\quad H_1 : \mu < 40$ months.

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{38 - 40}{5.8/8}$$

$z = -2.76$ $\quad P(z < -2.76) = 0.029$

decision rejected

Q 10.20

$\sigma = 0.24$ $\quad \bar{x} = 5.23$ $\quad n = 64$

$\mu = 5.5$ $\quad \alpha = 0.05$

$H_0 : \mu = 5.5$ $\quad H_1 : \mu < 5.5$

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

$P(z < -9) = 0$

H_1 is accepted.

Date

Q 10.21

$\bar{x} = 788$ $\sigma = 40$ $\mu = 800$

$n = 30$

$H_0: \mu = 800$ $H_1: \mu \neq 800$

$$z = \frac{788 - 800}{40/\sqrt{30}} \qquad z = -1.64$$

$2P(Z < -1.64) = 0.101$

mean is not significantly different from 800 for $\alpha < 0.101$

Q 10.22

$\bar{x} = 8.5$ $\mu = 8$ $\sigma = 2.25$

$n = 25$

$H_0: \mu = 8$ $H_1: \mu > 8$

$$z = \frac{8.5 - 8}{2.25/\sqrt{25}} = 3.33$$

$P(Z > 3.33) = 0.0004$

H_1 accepted, H_0 rejected.

Date

Q 10.23

$\bar{x} = 10.06$ $\quad \sigma = 0.246$ $\quad \mu = 10$

$n = 10$ $\quad \alpha = 0.01$ $\quad df = 9$

$H_0: \mu = 10$ $\quad H_1: \mu \neq 10$

$t < -3.25$ or $t > 3.25$

$$t = \frac{10.06 - 10}{0.246/\sqrt{10}} \qquad t = 0.77$$

fail to reject H_0.

Q 10.24

$\bar{x} = 165.2$ $\quad \sigma = 6.9$ $\quad \mu = 162.5$

$n = 50$

$H_0: \mu = 162.5\text{cm}$ $\quad H_1: \mu \neq 162.5\text{cm}$

$$z = \frac{165.2 - 162.5}{6.9/\sqrt{50}} = 2.77$$

$2P(z > 2.77) = 0.0056$

H_1 accepted. $\therefore \mu \neq 162.5$.

Date

Q 10.25

$\bar{x} = 23,500$ $\sigma = 3900$ $\mu = 20,000$

$n = 100$

$H_0: \mu = 20,000$ $H_1: \mu > 20,000$

$$z = \frac{23500 - 20000}{3900 / \sqrt{100}} = 8.97$$

$P(Z > 8.97) \approx 0$

H_1 accept, H_0 reject.

Q 10.26

$\bar{x} = 224$ $\sigma = 24.5$ $\mu = 220$

$n = 20$ $\alpha = 0.01$

$H_0: \mu = 220$ mg $H_1: \mu > 220$ mg

$df = 19$ $t > 1.729$

$$t = \frac{224 - 220}{24.5 / \sqrt{20}}$$

$t = 4.38$

H_1 accepted

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Q 10.27

$H_0 : \mu_1 = \mu_2$

$H_1 : \mu_1 > \mu_2$

$$\sigma_{sp} = \sqrt{\frac{29(10.5)^2 + 29(10.2)^2}{58}}$$

$$SP = 10.35$$

$$P\left[z > \frac{34}{10.35\sqrt{1/30 + 1/30}} \right] \approx 0$$

it means that running increase BMR in other words.