

Problem # 18

$$\hat{p} = 0.542$$

Problem # 19

$$H_0: p \leq 0.50$$

Problem # 20

$$H_1: p > 0.50$$

Problem # 21

Type of Test: z test for a Proportion

Problem # 22

Test Statistic: 2.66

$$\text{Calculation} = (0.542 - 0.5) / \sqrt{0.5 * (1 - 0.5) / 1000}$$

Problem # 23

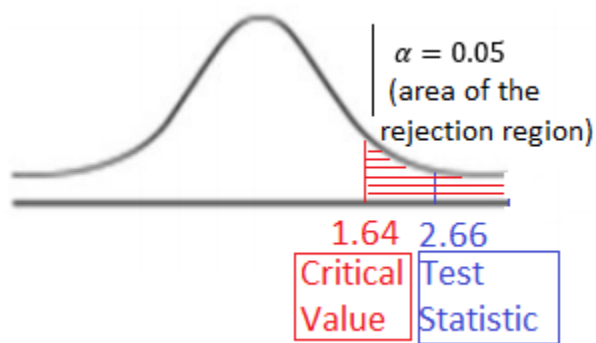
Critical Value(s): 1.64

Problem # 24

P-value: 0.0040

Problem 25 (See next page)

Problem # 25



Problem # 26

Reject the null hypothesis

Problem # 27

The data provide convincing evidence that a majority (more than 50%) of adult Americans prefer to watch movies at home.

Problem # 28

sample mean, $\bar{x} = 244.58$

sample standard deviation, $s = 12.56$

Problem # 29

$H_0: \mu = 240$

Problem # 30

$H_1: \mu \neq 240$

Problem # 31

Type of Test: t test for a Mean

Problem # 32

Test Statistic: 1.26

Calculation: $=(244.58-240)/(12.56/\text{SQRT}(12))$

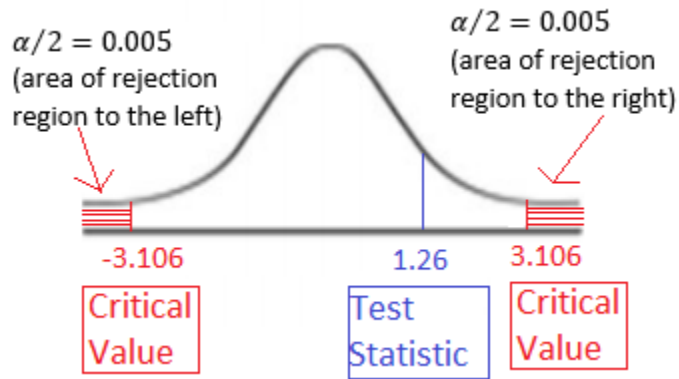
Problem # 33

Critical Values: -3.106 and 3.106

Problem # 34

P-value: 0.2323

Problem 35



Problem # 36

Fail to reject the null hypothesis

Problem # 37

The data do not provide convincing that the actual mean calorie content is different from the stated package value of 240.

Problem # 38

Quantitative because total energy is numerical and can be ordered or ranked.

Problem 39

Let X = total energy needed during pregnancy (kcal/day)

$X \sim \text{Normal} (\mu = 2600, \sigma = 50)$

$$\begin{aligned} P(X > 2625) &= P\left(Z > \frac{2625 - 2600}{50}\right) \\ &= P(Z > 0.50) \quad [\text{Note: The z-score is 0.50}] \\ &= 1 - P(Z < 0.50) \end{aligned}$$

$$= 1 - 0.6915$$

$$= \mathbf{0.3085}$$

Problem 40

Let $\bar{X}$ = mean total energy needed during pregnancy (kcal/day) of 20 randomly selected women

The population is normal

$$\mu_{\bar{x}} = \mu = 2600 \text{ and } \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{50}{\sqrt{20}} = 11.18$$

$$\bar{X} \sim \text{Normal} \left(\mu_{\bar{x}} = 2600, \quad \sigma_{\bar{x}} = \frac{50}{\sqrt{20}} \right)$$

The sample mean energy requirement is Normal with mean 2600 kcal/day and standard error $\frac{50}{\sqrt{20}} \approx 11.18$

Problem 41

$$P(\bar{X} > 2625) = P\left(Z > \frac{2625 - 2600}{11.18}\right)$$

$$= P(Z > 2.24) \quad [\text{Note: The z-score is 2.24}]$$

$$= 1 - P(Z < 2.24)$$

$$= 1 - 0.9875$$

$$= \mathbf{0.0125} \quad [\text{Solution using Standard Normal table}]$$

Problem 42

$$P(2580 < \bar{X} < 2615) = P(\bar{X} < 2615) - P(\bar{X} < 2580)$$

$$= P\left(Z < \frac{2615 - 2600}{11.18}\right) - P\left(Z < \frac{2580 - 2600}{11.18}\right)$$

$$= P(Z < 1.34) - P(Z < -1.79)$$

[Note: The z-scores are -1.79 and 1.34]

$$= 0.9099 - 0.0367$$

$$= \mathbf{0.8732}$$