

Test 7 Review

Name: Key Date: _____

Vocabulary—Know your vocab!


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Hypothesis Testing	Critical Value	T-Test	Null Hypothesis	One Tail
Statistical Hypothesis	Critical Region	Z-Test	Alternative Hypothesis	Two Tail
Non-Critical Region	Statistical Test	Test Value	α μ σ X n p q \bar{x}	


Hypothesis Testing: Complete all four steps for each.

- A • Hypothesis Testing for the Mean when $n \geq 30$ use the Z-Test and round to two decimals
 B • Hypothesis Testing for the Mean when $n < 30$ use the T-Test and round to three decimals
 C • Hypothesis Testing for Proportions use the Z-Test and round to two decimals


1. Medical Rehabilitation Education Foundation found that the average cost of cardiac rehabilitation is \$16,411. An administrator at Pine Valley Rehabilitation Center sampled 40 cardiac patients and found the mean cost was \$14,706 and the standard deviation was \$2,016. At $\alpha = 0.05$, can it be concluded that the average cost is different from \$16,411?

(A) ① $H_0: \mu = 16411$ $H_a: \mu \neq 16411$ ③ $Z = \frac{(14706 - 16411)}{(2016/\sqrt{40})} = -5.35$
 ②  $Z_{\frac{\alpha}{2}} = \pm 1.65$ ④ ... falls in CR ... reject ...


2. In a certain city, a researcher wishes to determine whether the average age of its citizens is really 61.2 years, as the mayor claims. A sample of 22 residents has an average age of 59.8 years. The standard deviation of the sample is 1.5 years. At $\alpha = 0.01$, is the average age of the residents really 61.2 years?

(B) ① $H_0: \mu = 61.2$ $H_a: \mu \neq 61.2$ ③ $T = \frac{(59.8 - 61.2)}{(1.5/\sqrt{22})} = -4.378$
 ②  $t_{\frac{\alpha}{2}} = \pm 2.831$ ④ ... falls in CR ... reject ...


3. A dietitian read in a survey that less than 60% of adults eat eggs for breakfast at least four times a week. To test this claim, he selected a random sample of 100 adults and asked them how many days a week they ate eggs. In his sample, 54 responded that they ate eggs at least four times a week. At $\alpha = 0.10$, do his results support the survey?

(C) ① $H_0: p = .6$ $H_a: p < .6$ ③ $Z = \frac{(54 - 100(.6))}{\sqrt{100 \cdot .6 \cdot .4}} = -1.22$
 ②  $Z_{\frac{\alpha}{2}} = -1.28$ ④ ... does not fall ... fail to reject ...

4. The financial aid director of a college believes that under 30% of the students are receiving some sort of financial aid. To see whether his belief is correct, the director selects a sample of 60 students and finds that 15 are receiving financial aid. At $\alpha = 0.05$, can the director conclude that less than 30% of the students are receiving financial aid?

(C) ① $H_0: p = .3$ $H_a: p < .3$ ③ $Z = \frac{(15 - 60(.3))}{\sqrt{60 \cdot .3 \cdot .7}} = -0.85$
 ②  $Z_{\frac{\alpha}{2}} = -1.65$ ④ ... does not fall ... fail to reject ...


5. An automobile dealer believes that the average cost of accessories in new automobiles is more than \$3000 over the base sticker price. He selects 50 new automobiles at random and finds that the average cost of the accessories is \$3256. The standard deviation is \$2300. Using $\alpha = 0.025$, test the claim.

(A) ① $H_0: \mu = 3000$ $H_a: \mu > 3000$ ③ $Z = \frac{(3256 - 3000)}{(2300/\sqrt{50})} = .79$
 ②  $Z_{\frac{\alpha}{2}} = +1.96$ ④ ... does not fall ... fail to reject ...

6. The average temperature during the summer months for the northeastern part of the United States is 67.0 degrees. A sample of 10 cities had an average temperature of 69.6 degrees for the summer of 1995. The standard deviation of the sample is 1.1 degrees. At $\alpha = 0.10$, can it be concluded that the summer of 1995 was warmer than average?

(B)


① $H_0: \mu = 67$ $H_a: \mu > 67$ ③ $T = \frac{(69.6 - 67)}{(1.1/\sqrt{10})} = 7.474$

②  $t_{\frac{\alpha}{2}} = +1.383$ ④ ... falls in CR ... reject ...

7. A recent study stated that if a person smoked, the average of the number of cigarettes he or she smoked was 14 per day. To test the claim, a researcher selected a random sample of 40 smokers and found that the mean number of cigarettes smoked per day was 18. The standard deviation was 6. At $\alpha = 0.05$, is the number of cigarettes a person smokes per day actually equal to 14?

(A)


① $H_0: \mu = 14$ $H_a: \mu \neq 14$ ③ $Z = \frac{(18 - 14)}{(6/\sqrt{40})} = 4.21$

②  $Z_{\frac{\alpha}{2}} = \pm 1.96$ ④ falls in CR ... reject ...

8. A contractor desires to build new homes with fireplaces. He read in a survey that 80% of all home buyers want a fireplace. To test this figure, he selected a sample of 30 home buyers and found that 20 wanted a fireplace. At $\alpha = 0.02$, should he arrive at the same conclusion as the survey?

(C)


① $H_0: p = .8$ $H_a: p \neq .8$ ③ $Z = \frac{(20 - .8(30))}{\sqrt{30 \cdot .8 \cdot .2}} = -1.83$

②  $Z_{\frac{\alpha}{2}} = \pm 2.33$ ④ ... does not fall ... fail to reject ...

9. A recent study claimed that the average age of murder victims in a small city was older than 22.6 years. A sample of 18 recent victims had a mean of 23.2 years and a standard deviation of 2 years. At $\alpha = 0.05$, is the claim substantiated?

(B)


① $H_0: \mu = 22.6$ $H_a: \mu > 22.6$ ③ $T = \frac{(23.2 - 22.6)}{(2/\sqrt{18})} = 1.273$

②  $t_{\frac{\alpha}{2}} = +1.740$ ④ .. does not fall ... fail to reject ...

10. A magazine article stated that the average age of men who were getting divorced for the first time was less than 40 years. A researcher decided to test this theory at $\alpha = 0.025$. She selected a sample of 20 men who were recently divorced and found that the average age was 38.6. The standard deviation of the sample was 4 years. Does her test support the theory?

(B)


① $H_0: \mu = 40$ $H_a: \mu < 40$ ③ $T = \frac{(38.6 - 40)}{(4/\sqrt{20})} = -1.565$

②  $t_{\frac{\alpha}{2}} = -2.093$ ④ ... does not fall ... fail to reject ...

11. A radio manufacturer claims that 65% of teenagers 13-16 years old have their own MP3 players. A researcher wishes to test the claim and selects a random sample of 80 teenagers. The researcher finds that 57 have their own MP3 players. At $\alpha = 0.05$, test the claim.

(C)


① $H_0: p = .65$ $H_a: p \neq .65$ ③ $Z = \frac{(57 - .65(80))}{\sqrt{80(.65)(.35)}} = 1.17$

②  $Z_{\frac{\alpha}{2}} = \pm 1.96$ ④ ... does not fall ... fail to reject ...

12. A high school counselor wishes to test the theory that the average age of the dropouts in her school district is 16.3 years. She samples 32 recent dropouts and finds that their mean age is 16.9 years. At $\alpha = 0.01$, is the theory correct? The standard deviation is 0.3.

(A)

① $H_0: \mu = 16.3$ $H_a: \mu \neq 16.3$ ③ $Z = \frac{(16.9 - 16.3)}{(0.3/\sqrt{32})} = 11.31$

②  $Z_{\frac{\alpha}{2}} = \pm 2.58$ ④ ... falls in CR ... reject ...