

**Assume that the data has a normal distribution. Find the critical  $z$  value(s) used to test a null hypothesis.**

1.  $\alpha = 0.02$  for two-tailed test.
2.  $\alpha = 0.01$  for a right-tailed test.

**Assume that the data has a normal distribution. Find the critical  $t$  value(s) used to test the null hypothesis.**

3.  $\alpha = 0.01$  for left-tailed test;  $n = 38$
4.  $\alpha = 0.05$  for two-tailed test;  $n = 21$

**Assume that the data has a normal distribution. Use the given information to find the P-value.**

5. The test statistic in a left-tailed test is  $z = -2.47$
6. The test statistic in a two-tailed test is  $z = -1.18$
7. The test statistic in a right-tailed test is  $t = 1.04$ , when  $n = 18$ .
8. The test statistic in a two-tailed test is  $t = 2.23$ , when  $n = 42$ .

**Find the appropriate critical value of  $z$  or  $t$  for the situation. If neither applies, explain why.**

9. Claim:  $\mu = 425$  Sample data:  $n = 24$ ,  $\bar{x} = 410$ ,  $\alpha = 0.10$   
The data appears to come from a normally distributed population with  $s = 30$ .
10. Claim:  $\mu > 56$  Sample data:  $n = 55$ ,  $\bar{x} = 42$ ,  $\alpha = 0.01$   
The data appears to come from a skewed population with  $\sigma = 12$ .

**Find the:**

- a) critical value(s)
- b) test statistic
- c) P-value

**Then, state the final conclusion.**

11. Claim: The percentage of blue M&M's is 24%.  
Sample data:  $x = 58$ ,  $n = 227$ , and  $\alpha = 0.10$
12. Claim: The mean score on a statistics test is more than 77  
Sample data:  $n = 35$ ,  $\bar{x} = 81$ ,  $s = 5.5$  min, and  $\alpha = 0.05$

**Conduct a 5 step hypothesis test using the traditional method to test the claim.**

**13.** In a random sample of 52 cereal servings of a certain brand of cereal, the mean of the sample was 227 mg. At  $\alpha = 0.02$ , test the claim that the mean sodium content per serving is less than 230. Assume  $\sigma$  is 10 mg.

**14.** In a random sample of 12 adults in the United States, the mean waste recycled per person per day is 1.2 pounds and the sample standard deviation is 0.3 pound. At a significance level of 0.01, test the claim that the mean waste recycled is more than 1 pound. Assume the population is normally distributed.

**15.** A maker of microwave ovens advertises that 10% of its microwaves need repair during the first five years of use. In a random sample of 57 microwave five years old, 8 needed repairs. Test the claim that 10% of its microwaves need repair during the first five years of use.

**Conduct a 5 step hypothesis test using the p-value method to test the claim.**

**16.** An employment information service reports that the mean annual salary for full-time male workers age 25 to 34 with a bachelor's degree is \$59,500. You doubt the validity of this claim. If a random sample of 43 full-time male workers has a mean annual salary of \$58,480 with a sample standard deviation of \$6200, test the claim that the mean annual salary for full-time male workers with a bachelor's degree is \$59,500. Use a significance level of 0.04.

**17.** In a random sample of 800 U.S. adults, 21% say they are smokers. At  $\alpha = 0.10$ , test the claim that less than 23% of U.S. adults are smokers.

**18.** A random sample of 180 people in the U.S. has a mean utilization of fresh citrus fruits of 92.5 pounds per year. At the .05 significance level, test the claim that the mean utilization of fresh citrus fruits by people in the U.S. is less than 94 pounds per year? Assume  $\sigma$  is 15 pounds.

## Chapter 7 Review

1.  $Z_{cv} = \pm 2.326$
2.  $Z_{cv} = 2.326$
  
3.  $T_{cv} = -2.431$
4.  $T_{cv} = \pm 2.086$
  
5. .00676
6. .238
7. .156
8. .0313
  
9.  $T_{cv} = \pm 1.714$
10.  $Z_{cv} = 2.326$
  
11.  $Z_{cv} = \pm 1.645$   
 $z = .547$   
pvalue: .584  
fail to reject null
  
12.  $T_{cv} = 1.691$   
 $t = 4.303$   
pvalue = .0000674  
reject null
  
13. left tail;  $Z_{cv} = -2.054$ ;  $z = -2.163$ ; reject null
  
14. right tail;  $T_{cv} = 2.718$ ;  $t = 2.309$ ; fail to reject null
  
15. two-tail;  $Z_{cv} = \pm 1.96$ ;  $z = 1.015$ ; fail to reject null
  
16. two-tail;  $t = -1.079$ ; pvalue: 0.287; fail to reject null
  
17. left-tail;  $z = -1.344$ ; pvalue: .0895; reject null
  
18. left tail;  $z = -1.342$ ; pvalue: .0898; fail to reject null