

**MULTIPLE CHOICE.** Choose the one that best completes the statement or answers the question.

- 1) Which of the following represent dependent samples. 1) \_\_\_\_\_
- i. Life spans of pairs of siblings.
  - ii. Life spans of randomly-selected pairs of people
  - iii. Life spans of pairs of mothers and daughters
- A) i, ii, and iii      B) i and iii      C) i      D) iii

- 2) A researcher wanted to determine if using an octane booster would increase gasoline mileage. A random sample of seven cars was selected; the cars were driven for two weeks without the booster and two weeks with the booster. Use the definitions of  $X_1$  and  $X_2$  as given in the table. Consequently,  $D = X_1 - X_2$ . 2) \_\_\_\_\_

<u>Gasoline Mileage</u> <u>Without booster, <math>X_1</math></u>	<u>Gasoline Mileage</u> <u>With booster, <math>X_2</math></u>
<u>(mpg)</u>	<u>(mpg)</u>
21.2	23.8
25.4	25.6
20.9	22.4
27.6	28.3
22.8	24.5
27.3	28.8
23.4	25.2

Determine the mean of the differences.

- A) -1.43      B) -1.67      C) 1.67      D) 6.3
- 3) A researcher wanted to determine if using an octane booster would increase gasoline mileage. A random sample of seven cars was selected; the cars were driven for two weeks without the booster and two weeks with the booster. Use the definitions of  $X_1$  and  $X_2$  as given in the table. Consequently,  $D = X_1 - X_2$ . 3) \_\_\_\_\_

<u>Gasoline Mileage</u> <u>Without booster, <math>X_1</math></u>	<u>Gasoline Mileage</u> <u>With booster, <math>X_2</math></u>
<u>(mpg)</u>	<u>(mpg)</u>
21.2	23.8
25.4	25.6
20.9	22.4
27.6	28.3
22.8	24.5
27.3	28.8
23.4	25.2

Compute the standard deviation of the differences.

- A) 0.84      B) 0.13      C) 0.78      D) 0.11

- 4) A researcher wanted to determine if using an octane booster would increase gasoline mileage. A random sample of seven cars was selected; the cars were driven for two weeks without the booster and two weeks with the booster. Use the definitions of  $X_1$  and  $X_2$  as given in the table. Consequently,  $D = X_1 - X_2$ . 4) \_\_\_\_\_

<u>Gasoline Mileage</u> <u>Without booster, <math>X_1</math></u>	<u>Gasoline Mileage</u> <u>With booster, <math>X_2</math></u>
<u>(mpg)</u>	<u>(mpg)</u>
21.2	23.8
25.4	25.6
20.9	22.4
27.6	28.3
22.8	24.5
27.3	28.8
23.4	25.2

What critical value should be used at  $\alpha = 0.05$ ?

- A) -1.943                      B) -2.447                      C) -1.895                      D) -2.365
- 5) Following is a sample of five matched pairs. 5) \_\_\_\_\_

Sample 1	23	26	18	32	28
Sample 2	19	14	16	12	14

Let  $\mu_1$  and  $\mu_2$  represent the population means and let  $\mu_d = \mu_1 - \mu_2$ . A test will be made of the hypotheses  $H_0: \mu_d = 0$  versus  $H_1: \mu_d > 0$ . Compute the test statistic.

- A) 4.651                      B) 1.405                      C) 3.141                      D) 8.547

6) In an experiment to determine whether there is a systematic difference between the weights obtained with two different mass balances, six specimens were weighed, in grams, on each balance. The following data were obtained:

6) \_\_\_\_\_

Specimen	A	B
1	14.89	14.89
2	13.06	13.07
3	14.49	14.49
4	13.25	13.23
5	10.18	10.14
6	7.58	7.57

State the null and alternate hypotheses.

A)  $H_0: \mu_d = 0, H_1: \mu_d < 0$

B)  $H_0: \mu_d > 0, H_1: \mu_d < 0$

C)  $H_0: \mu_d = 0, H_1: \mu_d = 0.01$

D)  $H_0: \mu_d = 0, H_1: \mu_d \neq 0$

7) In an experiment to determine whether there is a systematic difference between the weights obtained with two different mass balances, six specimens were weighed, in grams, on each balance. The following data were obtained:

7) \_\_\_\_\_

Specimen	A	B
1	14.86	14.83
2	9.44	9.41
3	11.99	11.99
4	9.27	9.26
5	6.13	6.13
6	13.78	13.76

Compute the test statistic.

A) 1.083

B) 2.433

C) 2.666

D) 0.313



- 14) Many elementary school students in a school district currently have ear infections. A random sample of children in two different schools found that 16 of 42 at one school and 17 of 30 at the other have ear infections. At the 0.05 level of significance, is there sufficient evidence to support the claim that a difference exists between the proportions of students who have ear infections at the two schools? 14) \_\_\_\_\_
- A) Yes, because the test value -7.33 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 B) Yes, because the test value -2.04 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 C) Yes, because the test value -13.09 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 D) No, because the test value -1.56 is inside the noncritical region  $-1.96 < z < 1.96$ .
- 15) A study of cats and dogs found that 30 of 60 cats and 11 of 40 dogs slept more than 10 hours per day. At the 0.05 level of significance, is there sufficient evidence to conclude that a difference exists between the proportions of cats and dogs that sleep more than 10 hours per day? 15) \_\_\_\_\_
- A) Yes, because the test value 2.24 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 B) Yes, because the test value 7.07 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 C) Yes, because the test value 2.66 is outside the noncritical region  $-1.65 < z < 1.65$ .  
 D) Yes, because the test value 5.78 is outside the noncritical region  $-1.65 < z < 1.65$ .
- 16) A recent survey reported that in a sample of 300 students who attend two-year colleges, 105 work at least 20 hours per week. Additionally, in a sample of 225 students attending private four-year universities, only 20 students work at least 20 hours per week. What is the test value for a test of the difference between these two population proportions? 16) \_\_\_\_\_
- A) 2.38                      B) 7.61                      C) 6.95                      D) 4.18
- 17) Two groups were polled about their attitudes towards capital punishment. In one group 30 out of 100 favored capital punishment, and in the other group 40 out of 80 favored capital punishment. Calculate an appropriate test value test the hypothesis that the population proportions are the same. 17) \_\_\_\_\_
- A) -37.40                      B) -13.68                      C) -0.20                      D) -2.73
- 18) 64% of students at a university live on campus. A random sample found that 28 of 45 male students and 39 of 50 of female students live on campus. At the 0.05 level of significance, is there sufficient evidence to support the claim that a difference exists between the proportions of male and female students who live on campus? 18) \_\_\_\_\_
- A) No, because the test value -0.84 is inside the noncritical region  $-1.96 < z < 1.96$ .  
 B) No, because the test value -1.68 is inside the noncritical region  $-1.96 < z < 1.96$ .  
 C) Yes, because the test value -17.98 is outside the noncritical region  $-1.96 < z < 1.96$ .  
 D) Yes, because the test value -3.69 is outside the noncritical region  $-1.96 < z < 1.96$ .

Answer Key

Testname: HW11

- 1) B
- 2) A
- 3) C
- 4) A
- 5) C
- 6) D
- 7) C
- 8) A
- 9) B
- 10) B
- 11) A
- 12) A
- 13) A
- 14) D
- 15) A
- 16) C
- 17) D
- 18) B