Tests of goodness of fit and independence

MULTIPLE CHOICE

1. A population where each element of the population is assigned to one and only one of several classes or categories is a
   a. multinomial population
   b. Poisson population
   c. normal population
   d. None of these alternatives is correct.

   ANS: A PTS: 1 TOP: Goodness of Fit and Independence

2. A goodness of fit test is always conducted as a
   a. lower-tail test
   b. upper-tail test
   c. middle test
   d. None of these alternatives is correct.

   ANS: B PTS: 1 TOP: Goodness of Fit and Independence

3. In order not to violate the requirements necessary to use the chi-square distribution, each expected frequency in a goodness of fit test must be
   a. at least 5
   b. at least 10
   c. no more than 5
   d. less than 2

   ANS: A PTS: 1 TOP: Goodness of Fit and Independence

   Exhibit 12-1
   When individuals in a sample of 150 were asked whether or not they supported capital punishment, the following information was obtained.

Do you support capital punishment?	Number of individuals
Yes	40
No	60
No Opinion	50

   We are interested in determining whether or not the opinions of the individuals (as to Yes, No, and No Opinion) are uniformly distributed.

4. Refer to Exhibit 12-1. The calculated value for the test statistic equals
   a. 2
   b. -2
   c. 20
   d. 4

   ANS: D PTS: 1 TOP: Goodness of Fit and Independence

5. Refer to Exhibit 12-1. The *p*-value is
   a. larger than 0.1
   b. less than 0.1
   c. less than 0.05
   d. larger than 0.9

   ANS: A PTS: 1 TOP: Goodness of Fit and Independence

Exhibit 12-2
Last school year, the student body of a local university consisted of 30% freshmen, 24% sophomores, 26% juniors, and 20% seniors. A sample of 300 students taken from this year's student body showed the following number of students in each classification.

Freshmen	83
Sophomores	68
Juniors	85
Seniors	64

We are interested in determining whether or not there has been a significant change in the classifications between the last school year and this school year.

6. Refer to Exhibit 12-2. The expected number of freshmen is
   a. 83
   b. 90
   c. 30
   d. 10

   ANS: B PTS: 1 TOP: Goodness of Fit and Independence

7. Refer to Exhibit 12-2. The calculated value for the test statistic equals
   a. 0.5444
   b. 300
   c. 1.6615
   d. 6.6615

   ANS: C PTS: 1 TOP: Goodness of Fit and Independence

8. Refer to Exhibit 12-2. At 95% confidence, the null hypothesis
   a. should not be rejected
   b. should be rejected
   c. was designed wrong
   d. None of these alternatives is correct.

   ANS: A PTS: 1 TOP: Goodness of Fit and Independence

Exhibit 12-4
In the past, 35% of the students at ABC University were in the Business College, 35% of the students were in the Liberal Arts College, and 30% of the students were in the Education College. To see whether or not the proportions have changed, a sample of 300 students was taken. Ninety of the sample students are in the Business College, 120 are in the Liberal Arts College, and 90 are in the Education College.

9. Refer to Exhibit 12-4. The expected frequency for the Business College is
   a. 0.3
   b. 0.35
   c. 90
   d. 105

   ANS: D PTS: 1 TOP: Goodness of Fit and Independence

10. Refer to Exhibit 12-4. The hypothesis is to be tested at the 5% level of significance. The critical value from the table equals
    a. 1.645
    b. 1.96
    c. 5.991
    d. 7.815

    ANS: C PTS: 1 TOP: Goodness of Fit and Independence

11. Refer to Exhibit 12-4. The conclusion of the test is that the
    a. proportions have changed significantly
    b. proportions have not changed significantly
    c. test is inconclusive
    d. None of these alternatives is correct.

    ANS: B PTS: 1 TOP: Goodness of Fit and Independence

12. The number of degrees of freedom for the appropriate chi-square distribution in a test of independence is
    a. n-1
    b. K-1
    c. number of rows minus 1 times number of columns minus 1
    d. a chi-square distribution is not used

    ANS: C PTS: 1 TOP: Goodness of Fit and Independence

13. The degrees of freedom for a contingency table with 6 rows and 3 columns is
    a. 18
    b. 15
    c. 6
    d. 10

    ANS: D PTS: 1 TOP: Goodness of Fit and Independence