Contents

Answers to the End-of-Section Questions ................. ........................................... 3
Answers to the Comprehensive Review Questions on pages 167–174 ............ 8
Tet
Answers to the Test-Item Bank............................................................. 17

Answers to the End-of-Section Questions

Section 1: The Empirical Approach to Knowledge
1. The use of observation to obtain information. 2. Yes. 3. Empirical research.

Section 2: Types of Empirical Research
1. Experimental. 2. Dependent variable. 3. To identify cause-and-effect relationships.
7. A study in which observations are made to determine the status of what exists at a
given point in time without the administering of treatments. 8-9. Answers may vary.

Section 3: Introduction to Sampling
1. Population. 2. Parameters. 3. Freedom from bias. 4. Yes. 5. Random. 6. Put
the names of all members of a population on slips of paper, thoroughly mix the slips, and
have a blindfolded assistant select the number desired for the sample. 7. Yes. 8. When
large samples are used. 9. No. 10. No. 11-12. Answers may vary.

Section 4: Scales of Measurement

Section 5: Descriptive, Correlational, and Inferential Statistics
1. Descriptive statistic. 2. Descriptive statistic. 3. To describe the relationship
between two or more variables for one group of participants. 4. 0.00. 5. How much
confidence we can have when generalizing from a sample to a population. 6. Inferential
statistic. 7. Random sampling may have produced errors, which should be considered when interpreting results. 8. Census. 9. Because there is no sampling error.

Section 6: Frequencies, Percentages, and Proportions
1. Number of participants or cases. 2. Lowercase, italicized/3. Number of participants in a population. 4. 21. 5. 200. 6. A proportion. 7. Percentages. 8. Percentages alone can sometimes be misleading or not provide sufficient information.

Section 7: Shapes of Distributions

Section 8: The Mean: An Average
1. By summing the scores and dividing by the number of scores. 2. $M$ and $m$. 3. Zero. 4. Wording may vary. Sample answer: Because two children in Group B gave much larger contributions than the other children. 5. It will pull the mean up (increase its value). 6. No. 7. Interval and ratio. 8. Average.

Section 9: Mean, Median, and Mode

Section 10: Range and Interquartile Range
1. Measures of variability. 2. Spread and dispersion. 3. There is no variability. 4. Much variability. 5. The difference between the highest and lowest scores. (Some statisticians add the constant 1 to the difference.) 6. It is based on only the two most extreme scores, which may not accurately reflect the true variability in the entire group. 7. 2. 8. 75. 9. No. 10. The range of the middle 50% of the participants. 11. No. 12. The interquartile range.

Section 11: Standard Deviation
Section 12: Correlation

1. Choice A. 2. Negative relationship. 3. Inverse. 4. Direct. 5. Leona, because she scored high on TestE but low on Test F. 6. Low. 7. High. 8. An experiment. 9. No. 10. Many exceptions to the positive relationship. 11. Answers may vary. Examples are: (a) height and weight, (b) success in algebra and success in calculus classe, and (c) interest in politics and political activism. 12. Answers may vary. Examples are: (a) attitudes toward democracy and attitudes toward dictatorships, (b) number of disruptive classroom behaviors and teachers' ratings of classroom behavior (where higher ratings indicate better behavior), and (c) amount of time waiting for a public bus and satisfaction with bus service.

Section 13: Pearson \( r \)


Section 14: Coefficient of Determination

1. By squaring it. 2. \( r^2 \). 3. .25. 4. 25%. 5. 75%. 6. 9%. 7. 91%. 8. Small values. 9. No, because the .40 has to be squared before converting to a percentage.

Section 15: Scattergram

1. Correlation. 2. A general overview of a correlational relationship. 3. Choice A. 4. Choice B. 5. 100%. 6. Choice B. 7. The scattergram in Figure 15.3 on page 75. (Note: The one with the most scatter has the lowest value of \( r \).) 8. Inverse or negative. 9. Answers may vary.

Section 16: Multiple Correlation

1. Choice A. 2. Choice B. 3. Choice B. 4. Choice C. 5. 16% (Note: .40 x .40 = .16 x 100% = 16%). 6. Choice B. 7. Choice A. 8. Yes. 9. Answers may vary. Sample answer: It indicates that while the overall relationship is direct, it is not perfect because Michelle is an exception to the overall trend.

Section 17: Variations on Random Sampling

1. Bias. 2. Simple random. 3. 44 and 02. 4. 112 and 077. (Note: The first number in the fourth row is 732, which is larger than 500, so it does not select a participant.) 5. Stratified random. 6. Stratified random. 7. No. 8. Random cluster. 9. Multistage random. 10. Answers may vary. In their answers, some students may
note that random cluster sampling might be used by selecting a random sample of course sections and contacting the professors of these sections to distribute a questionnaire to the students.

**Section 18: Sample Size**

1. The extent to which the same results would be obtained if another random sample were drawn from the same population.  
2. Increase sample size.  
3. Researcher Doe.  
4. True.  
5. False.  
6. A relatively large sample.  
7. False.  
8. Relatively large samples.  
9. No.  
10. Answers may vary.

**Section 19: Standard Error of the Mean**

1. False.  
2. Yes.  
3. No.  
4. False.  
5. 27.00 and 33.00.  
6. By subtracting the standard error of the mean from the mean, and by adding the standard error of the mean to the mean.  
7. A point estimate.  
8. False.  
9. By using reasonably large samples.  
10. Answers may vary. *Sample answer:* There is a 95% chance that the true population mean lies between 95.00 and 105.00.

**Section 20: Introduction to the Null Hypothesis**

1. The null hypothesis.  
2. A research hypothesis.  
3. Directional.  
4. Directional.  
5. Ho.  
7. The population mean for one group.  
8. Inferential.  
9. Wording may vary. *Sample answer:* No, because there was no sampling (all were tested), there are no sampling errors. The null hypothesis only states that a difference is due to sampling errors, which are not possible in this instance.

**Section 21: Decisions About the Null Hypothesis**

1. The probability that the null hypothesis is true.  
2. Choice A.  
3. Declaring a result statistically significant.  
4. Type I Error.  
5. Reject it.  
6. The .01 level.  
7. The .001 level.  
8. Statistically significant.  
9. Statistically insignificant  
10. No.

**Section 22: Introduction to the t Test**

1. Two.  
2. Null hypothesis.  
3. Choice A.  
4. Reject it  
5. Choice A.  
6. Choice B.  
7. No.  
8. Dependent  
9. Choice B.

**Section 23: Reports of the Results of Tests**

1. Mean, standard deviation, and number of cases.  
2. Yes.  
3. Yes.  
4. The probability is greater than .05 (greater than 5 in 100).  
5. No.  
6. No.  
7. Choice B.
Section 24: One-Way ANOVA

1. Analysis of variance.  2. An F test.  3. False.  4. No.  5. The value of $p$.  6. No.  7. Yes.  8. Yes.  9. One-way ANOVA.  10. Two-way ANOVA.  11. While answers may vary, students should describe a study in which there are more than two groups whose means are to be compared.

Section 25: Two-Way ANOVA

1. No. (Note: The column means are the same.)  2. No. (Note: The row means are the same.)  3. Yes. (Note: 230.00 - 200.00 equals 30.00 for the new type of instruction, but 200.00 - 230.00 equals -30.00 for the conventional type. Because 30.00 is not equal to -30.00, there is an interaction. The interaction is such that the new type of instruction is superior for participants with previous experience, while the conventional type of instruction is superior for those without previous experience. Thus, the type of instruction interacts with the participants' previous experience.)  4. Yes. (Note: The column mean for back pain is higher than the column mean for headache pain.)  5. Yes. (Note: The row mean for Type A is higher than the row mean for Type B.)  6. No. (Note: For back pain, 25.00 for Type A minus 15.00 for Type B equals 10.00. For headache pain, 20.00 for Type A minus 10.00 for Type B also equals 10.00. Thus, for both types of pain, Type A pain reliever is 10.00 points superior to Type B. Thus, the type of pain does not interact with the type of pain reliever. Regardless of the type of pain, Type A pain reliever is equally superior to Type B.)  7. Yes.  8. No.  9. Yes.  10. Answers may vary. Students should describe a study in which participants are classified in two ways, resulting in means for the categories on both variables.

Section 26: Chi-Square

1. No, because the chi-square test is a test of the difference between frequencies — not a test of the difference between means.  2. Yes.  3. Two-way chi-square test.  4. One-way chi-square test.  5. Two-way chi-square test.  6. Reject it.  7. Yes.  8. Do not reject it.  9. 1,000.

Section 27: Limitations of Significance Testing

1. Random sampling errors.  2. Choice A.  3. No.  4. Yes.  5. Yes.  6. Yes.  7. Finding an inexpensive treatment that produces a large beneficial effect.  8. No.  9. Yes.  10. Answers may vary. Sample answer: The statement does not indicate whether the difference in favor of Alpha is a statistically significant difference. If it is statistically significant, the probability level is not given. Also, if the difference is statistically significant, the statement fails to address practical significance, and it does not indicate the size of the difference.
Section 28: Effect Size
1. 0.50. 2. No. 3. One. 4. 1.40+. 5. Large. 6. When the control group’s mean is higher than the experimental group’s mean. 7. Before. So Answers may vary.

Answers to the Comprehensive Review Questions on pages 167–174 in the book

Section 1: The Empirical Approach to Knowledge

Section 2: Types of Empirical Research

Section 3: Introduction to Sampling

Section 4: Scales of Measurement

Section 5: Descriptive, Correlational, and Inferential Statistics

Section 6: Frequencies, Percentages, and Proportions

Section 7: Shapes of Distributions

Section 8: The Mean: An Average

Section 9: Mean, Median, and Mode

Section 10: Range and Interquartile Range

Section 11: Standard Deviation

Section 12: Correlation

Section 13: Pearson r
Section 14: Coefficient of Determination

Section 15: Scattergram

Section 16: Multiple Correlation

Section 17: Variations on Random Sampling

Section 18: Sample Size

Section 19: Standard Error of the Mean

Section 20: Introduction to the Null Hypothesis

Section 21: Decisions About the Null Hypothesis

Section 22: Introduction to the $t$ Test

Section 23: Reports of the Results of Tests

Section 24: One-Way ANOVA

Section 25: Two-Way ANOVA

Section 26: Chi-Square

Section 27: Limitations of Significance Testing

Section 28: Effect Size
Test-Item Bank

Answers are shown at the end of this test-item bank.

Notes on Test Security: In order to maintain test security, three steps might be taken: (1) use a different selection of the items each semester, thereby rotating them over several years, (2) use only a sample of the items below in a given test and supplement them with items written by the instructor, and (3) slightly modify items by changing key words or numbers in order to change the correct answers to some questions.

Section 1: The Empirical Approach to Knowledge

1. "When researchers rely on authority for knowledge, they are using the empirical approach to knowledge." This statement is A. true. B. false.

2. If there are 200 nurses employed by a hospital and 50 are selected for observation, the 200 are known as A. sample. B. population.

3. "Organizing and summarizing data is only a minor function of statistics." This statement is A. true. B. false.

4. "Both everyday observation and research can be misleading." This statement is A. true. B. false.

5. Research differs from everyday observation primarily because researchers A. plan their observations in advance. B. rely on their expert hunches.

Section 2: Types of Empirical Research

1. In which type of study are no treatments given? A. Nonexperimental. B. Experimental.

2. "The participants' responses in an experiment constitute the independent variable." This statement is A. true. B. false.

3. Suppose a researcher gave welfare recipients two types of job training to see which type was more effective in helping them get jobs. Getting jobs is the A. independent variable. B. dependent variable.

4. "The purpose of an experiment is to identify cause-and-effect relationships." This statement is A. true. B. false.

5. Which of the following is an example of a nonexperimental study? A. A survey of political attitudes. B. A study with a control group. C. A study with treatments.

Section 3: Introduction to Sampling

1. Which of the following is obtained when we study samples? A. Parameters. B. Statistics.

2. "Using a very large sample is the most important characteristic of a good sample." This statement is A. true. B. false.

3. Random sampling identifies a sample that A. contains sampling errors. B. is free of all errors. C. is biased.

4. "Using random sampling identifies an unbiased sample." This statement is A. true. B. false.

5. To determine the opinions of all bicycle owners in a city, a researcher surveys the customers at two bicycle shops that happen to be near her residence. She is using a A. sample of convenience. B. simple random sample.

Section 4: Scales of Measurement

1. If students name their favorite sport, the resulting data are at what level? A. Ordinal. B. Interval. C. Ratio. D. Nominal.
2. If an employer ranks employees from low to high on customer service, the employer is using what scale of measurement?
   A. Ordinal.
   B. Interval.
   C. Ratio.
   D. Nominal.

3. Which scale of measurement has an absolute zero?
   A. Ordinal.
   B. Interval.
   C. Ratio.
   D. Nominal.

4. "The ratio scale of measurement is a higher level of measurement than the interval scale." This statement is
   A. true.  B. false.

5. "The lowest level of measurement is the nominal level." This statement is
   A. true.  B. false.

Section 5: Descriptive, Correlational, and Inferential Statistics

1. A percentage is an example of
   A. an inferential statistic.
   B. a descriptive statistic.
2. "A population may be large or small." This statement is
   A. true.  B. false.
3. An average is an example of
   A. an inferential statistic.
   B. a descriptive statistic.
4. A correlation coefficient is based on one group's performance on how many variables?
   A. One.
   B. Two or more.
5. "Inferential statistics are tools that indicate how much confidence researchers can have when they generalize from a sample to a population." This statement is
   A. true.  B. false.

Section 6: Frequencies, Percentages, and Proportions

1. "In descriptive statistics, the letter N stands for number of participants in a population." This statement is
   A. true.  B. false.
2. If there are 2,000 adult citizens in a town and 20% favor building a new public library, how many favor it?
   A. 200.
   B. 400.
   C. Some other number.

3. If 25 out of 100 parents favor an extended school day, what percentage favors it?
   A. 2.5.
   B. 25.
   C. 50.
   D. Some other percentage.

4. "For a percentage of 79%, the corresponding proportion is .79." This statement is
   A. true.  B. false.

5. "Proportions are usually easier to interpret than percentages." This statement is
   A. true.  B. false.

Section 7: Shapes of Distributions

1. "A frequency distribution is a table that shows how many participants have each score." This statement is
   A. true.  B. false.
2. "A normal curve is also called a bell-shaped curve." This statement is
   A. true.  B. false.
3. When a curve has a tail to the right but no tail to the left, it is said to have a
   A. positive skew.
   B. negative skew.

4. "Income in large populations usually forms a normal curve when plotted." This statement is
   A. true.  B. false.

5. "When a distribution is skewed to the right, it is said to have a positive skew." This statement is
   A. true.  B. false.

Section 8: The Mean: An Average

1. "The uppercase letter \( X' \) with a bar over it is a symbol for the mean." This statement is
   A. true.  B. false.
2. "The mean is a measure of central tendency." This statement is
   A. true.  B. false.
3. If you compute the deviations from the mean for a set of scores and then sum the deviations, what sum will you get?
   A. 100.
   B. 0.
   C. 0.
   D. Some other number.

4. The mean is not associated with which one of the following scales of measurement?
   A. Interval.
   B. Nominal.
   C. Ratio.

5. "The mean can be misleading when used to describe skewed distributions." This statement is
   A. true.  B. false.

Section 9: Mean, Median, and Mode

1. Which average is defined as the middle point in a distribution?
   A. Mean.
   B. Median.
   C. Mode.

2. If the median for a set of scores equals 136, what percentage of the scores is below 136?
   A. 25%.
   B. 33%.
   C. 75%.
   D. Some other percentage.

3. "The median is insensitive to extreme scores." This statement is
   A. true.  B. false.

4. "In a distribution with a positive skew, the median has a higher value than the mean." This statement is
   A. true.  B. false.

5. What is the mode of the following scores?
   Scores: 1, 1, 1, 4, 5, 6
   A. 4.
   B. 3.
   C. 1.
   D. Some other value.

Section 10: Range and Interquartile Range

1. "A synonym for the term variability is spread." This statement is
   A. true.  B. false.

2. "The range is a statistic that describes variability." This statement is
   A. true.  B. false.

3. In the following set of scores, which score is an outlier?
   Scores: 1, 1, 3, 4, 6, 7, 30
   A. 1.
   B. 4.
   C. 7.
   D. 30.

4. "When the median is reported as the average for a set of scores, it is customary to report the interquartile range as a measure of variability." This statement is
   A. true.  B. false.

5. "The interquartile range is defined as the range of the middle 25% of the participants." This statement is
   A. true.  B. false.

Section II: Standard Deviation

1. "The standard deviation is based on the differences between the scores in a distribution and their mean." This statement is
   A. true.  B. false.

2. Which group has a smaller standard deviation?
   A. Scores for Group I: 10, 20, 30, 40, 50.
   B. Scores for Group II: 30, 31, 32, 33, 34.

3. If all participants in a group have the same score, the standard deviation of their scores equals
   A. 1.
   B. 100.
   C. Some other value.

4. In a normal distribution, what percentage of the cases lies between one standard deviation unit above the mean and one standard deviation unit below the mean?
   A. 34%.
   B. 50%.
   C. 68%.

5. In a normal distribution with a mean of 90.00 and a standard deviation of 10.00, what percentage of the cases lies between scores of 80 and 90?
   A. 34%.
   B. 50%.
   C. 68%.
Section 12: Correlation

1. For the scores on Test D and Test E shown below, there is
   A. a direct relationship.
   B. an inverse relationship.
   C. no relationship.
   
<table>
<thead>
<tr>
<th>Student</th>
<th>TestD</th>
<th>TestE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bud</td>
<td>19</td>
<td>789</td>
</tr>
<tr>
<td>Francis</td>
<td>17</td>
<td>554</td>
</tr>
<tr>
<td>Cathleen</td>
<td>12</td>
<td>333</td>
</tr>
<tr>
<td>Jennifer</td>
<td>10</td>
<td>202</td>
</tr>
</tbody>
</table>

2. For the scores on Test F and Test G shown below, there is
   A. a direct relationship.
   B. an inverse relationship.
   C. no relationship.
   
<table>
<thead>
<tr>
<th>Student</th>
<th>Test F</th>
<th>Test G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rafe</td>
<td>101</td>
<td>29</td>
</tr>
<tr>
<td>Lester</td>
<td>123</td>
<td>17</td>
</tr>
<tr>
<td>Marjorie</td>
<td>144</td>
<td>14</td>
</tr>
<tr>
<td>Leslie</td>
<td>198</td>
<td>10</td>
</tr>
</tbody>
</table>

3. "An inverse relationship is sometimes called a positive relationship." This statement is
   A. true.  B. false.

4. "In a direct relationship, those who are high on one variable tend to be high on the other." This statement is
   A. true.  B. false.

5. Which type of study is recommended in order to study causation?
   A. A correlational study.
   B. An experimental study.

Section 13: Pearson r

1. When there is a perfect, direct relationship, what is the value of r?
   A. 0.50.
   B. 0.00.
   C. -1.00.
   D. Some other value.

2. "It is impossible for a relationship to be both inverse and strong." This statement is
   A. true.  B. false.

3. Which of the following values of r represents the strongest relationship?
   A. -1.00.
   B. 0.00.
   C. -.50.

4. "An r of -.45 represents a stronger relationship than an r of .88." This statement is
   A. true.  B. false.

5. "It is appropriate to convert a Pearson r to a percentage by multiplying it by 100." This statement is
   A. true.  B. false.

Section 14: Coefficient of Determination

1. "The symbol for the coefficient of determination is r." This statement is
   A. true.  B. false.

2. For a given value of the Pearson r, the coefficient of determination is computed by
   A. taking the square root of r.
   B. squaring r.

3. "For an r of .60, the ability to predict is 36% better than zero." This statement is
   A. true.  B. false.

4. When the coefficient of determination equals .70, what percentage of the variance on one variable is not predicted by the other variable?
   A. 70%.
   B. 49%.
   C. 30%.
   D. Some other percentage.

5. "When r = .20, the percentage of variance accounted for is 20%." This statement is
   A. true.  B. false.

Section 15: Scattergram

1. Are scattergrams frequently presented in research reports?
   A. Yes.
   B. No.

2. In a scattergram for a weak relationship, there is
   A. much scatter.
   B. little scatter.

3. In the social and behavioral sciences, it is common to find scattergrams with
   A. no scatter.
   B. some scatter.

4. "When the dots in a scattergram form a pattern from the lower left to the upper right, the relationship is direct." This statement is
   A. true.
   B. false.
Section 16: Multiple Correlation
1. When high scores on one variable are associated with high scores on the other variable, this suggests that the relationship is
   A. direct.  B. inverse.
2. Which of the following values of \( R \) represents the strongest relationship?
   A. \( R = .00 \).
   B. \( R = -1.00 \).
   C. \( R = .95 \).
3. For determining the correlation between a combination of two predictors to predict a third variable, which of the following should be computed?
   A. \( R \).  B. \( r \).
4. If \( R^2 = .25 \), what percentage of the variance is accounted for?
   A. 25%.  B. 75%.
5. Suppose a researcher was examining the validity of a combination of hours spent doing homework and attitudes toward school as predictors of grades in a course. Which correlational statistic should the researcher compute for this research problem?
   A. \( R \).  B. \( r \).

Section 17: Variations on Random Sampling
1. Putting 100 names in a hat, mixing them thoroughly, and drawing out 10 names constitutes
   A. cluster sampling.  B. stratified random sampling.  C. simple random sampling.
2. Which of the following is usually superior?
   A. Simple random sampling.  B. Stratified random sampling.
3. Does the use of stratified random sampling eliminate all sampling errors?
   A. Yes.  B. No.

Section 18: Sample Size
1. Decreasing sample size
   A. decreases precision.  B. decreases bias.  C. decreases precision and decreases bias.
2. Which of the following would produce a greater reduction in sampling errors?
   A. Increasing the size of a sample from 100 to 150 (an increase of 50).
   B. Increasing the size of a sample from 300 to 350 (an increase of 50).
3. "Even small samples can identify very large differences." This statement is
   A. true.  B. false.
4. "For populations with very limited variability, very large samples are needed for sufficient precision." This statement is
   A. true.  B. false.
5. "Using a large sample eliminates bias." This statement is
   A. true.  B. false.

Section 19: Standard Error of the Mean
1. The smaller the variability in a population, the
   A. larger the standard error of the mean.  B. smaller the standard error of the mean.
2. "According to the central limit theorem, the sampling distribution of means is normal." This statement is
   A. true.  B. false.
3. "Random sampling identifies a sample that is subject to sampling errors." This statement is
   A. true.  B. false.
4. If \( \mu_m = 90.00 \) and \( \text{SEM} = 4.00 \), what are the limits of the 68% confidence interval for the mean?
   A. 86.00 and 90.00.
   B. 90.00 and 94.00.
   C. 4.00 and 8.00.
   D. 86.00 and 94.00.

5. If you decrease the sample size, what effect does this have on the size of the standard error of the mean?
   A. It increases it.
   B. It decreases it.

Section 20: Introduction to the Null Hypothesis

1. Which of the following is a correct statement of the null hypothesis?
   A. The observed difference between the means was created by bias.
   B. The observed difference between the means was created by sampling error.

2. Which of the following is a symbol for an alternative hypothesis?
   A. \( H_0 \).
   B. \( H_1 \).

3. "For a given study, the research hypothesis usually is inconsistent with the null hypothesis." This statement is
   A. true.  B. false.

4. "Whichever hypothesis a researcher believes is true at the beginning of a study is the research hypothesis." This statement is
   A. true.  B. false.

5. "The null hypothesis states that the difference between the means in the population is greater than zero." This statement is
   A. true.  B. false.

Section 21: Decisions About the Null Hypothesis

1. By conventional standards, if \( p > .05 \), a researcher would declare the difference statistically
   A. insignificant.
   B. significant.

2. "The .01 level is a higher level of significance than the .001 level." This statement is
   A. true.  B. false.

3. Failing to reject the null hypothesis when in reality it is false is known as a
   A. Type I Error.
   B. Type II Error.

4. At what point is it conventional to not reject the null hypothesis?
   A. When \( p > .05 \).
   B. When \( p < .05 \).

5. "When a researcher rejects the null hypothesis, the difference is declared statistically significant." This statement is
   A. true.  B. false.

Section 22: Introduction to the \( t \) Test

1. "A \( t \) test yields a probability that the null hypothesis is correct." This statement is
   A. true.  B. false.

2. "The larger the sample, the more likely the \( n \) II hypothesis will be rejected." This statement is
   A. true.  B. false.

3. Under which of the following circumstances is the null hypothesis more likely to be rejected?
   A. When there is much variation in the population.
   B. When there is little variation in the population.

4. If participants are randomly assigned to experimental and control groups without matching (i.e., pairing), the resulting data are
   A. independent.
   B. dependent.

5. "Independent data may have less sampling error than dependent data." This statement is
   A. true.  B. false.

Section 23: Reporting the Results of \( t \) Tests

1. "When reporting the results of a \( t \) test, the values of the means and standard deviations should first be reported." This statement is
   A. true.  B. false.

2. If you read that \( t = 2.234, df = 60, p > .05 \), what should you conclude?
   A. The difference is statistically significant.
   B. The difference is not statistically significant.

3. "If a \( t \) test yields \( p > .05 \), the null hypothesis normally would be rejected." This statement is
   A. true.  B. false.

4. If a researcher concludes that a difference is statistically significant, what else is true?
   A. The null hypothesis should not be rejected.
   B. The null hypothesis should be rejected.

5. "Statistical significance is synonymous with practical significance." This statement is
   A. true.  B. false.
Section 24: One-Way ANOVA

1. "ANOVA can be used to test for the difference(s) among two or more means." This statement is
   A. true   B. false.

2. "The acronym ANOVA stands for Alternative Number of Variance Approach." This statement is
   A. true   B. false.

3. For the typical consumer of research, which one of the following values in an ANOVA table is of greatest interest?
   A. Mean squares.
   B. Sum of squares.
   C. The value of $p$.

4. Suppose you read the following: $F = 4.641, df = 3, 29, p < .05$. What conclusion would you normally draw about the null hypothesis?
   A. Reject it.
   B. Do not reject it.

5. Suppose you read the following: $F = 2.20, df = 4, 400, p > .05$. What conclusion would you normally draw about statistical significance?
   A. It is statistically significant.
   B. It is not statistically significant.

Section 25: Two-Way ANOVA

1. Suppose participants were classified according to their major in school and their gender in order to compare means for both major and gender. This would call for a
   A. one-way ANOVA.
   B. two-way ANOVA.

2. In order to examine a main effect, you
   A. temporarily ignore one way that the participants were classified while examining the results of the other way they were classified.
   B. look at both ways participants were classified at the same time in order to see how the two classification variables affect each other.

3. "In the table below, there appears to be an interaction." This statement is
   A. true   B. false.

<table>
<thead>
<tr>
<th>$X$</th>
<th>$Y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D$</td>
<td>$M = 10.00$</td>
</tr>
<tr>
<td>$E$</td>
<td>$M = 20.00$</td>
</tr>
</tbody>
</table>

4. "In the table below, there appears to be an interaction." This statement is
   A. true   B. false.

<table>
<thead>
<tr>
<th>$S$</th>
<th>$T$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U$</td>
<td>$M = 100.00$</td>
</tr>
<tr>
<td>$V$</td>
<td>$M = 200.00$</td>
</tr>
</tbody>
</table>

5. Suppose you read that $p < .05$ for an interaction. By conventional standards, you should declare the interaction
   A. statistically significant.
   B. not statistically significant.

Section 26: Chi-Square

1. "For nominal data, a researcher normally reports means and standard deviations." This statement is
   A. true   B. false.

2. The symbol for chi-square is
   A. $\chi^2$
   B. $\Phi$
   C. $/\$

3. "For the data in the following table, a one-way chi-square would be an appropriate test of significance." This statement is
   A. true   B. false.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>$n = 30$</td>
<td>$n = 40$</td>
</tr>
<tr>
<td>Women</td>
<td>$n = 40$</td>
<td>$n = 30$</td>
</tr>
</tbody>
</table>

4. Suppose you read that as the result of a chi-square test, $p < .01$. By conventional standards, what decision should be made about the null hypothesis?
   A. Reject it.
   B. Do not reject it.

5. Suppose you read that as the result of a chi-square test, $p > .05$. By conventional standards, what decision should be made about statistical significance?
   A. It is significant.
   B. It is not significant.

Section 27: Limitations of Significance Testing

1. "The null hypothesis is a statement about the size of the difference." This statement is
   A. true   B. false.

2. "Knowing the value of $p$ tells us the size of the difference." This statement is
   A. true   B. false.
3. Is the variability among scores one of the factors that contribute to determining statistical significance?  
A. Yes.  B. No.

4. Is a small difference necessarily an insignificant difference?  
A. Yes.  B. No.

5. Is it possible for a large, significant difference to have little practical significance?  
A. Yes.  B. No.

Section 28: Effect Size

1. "The purpose of effect size is to determine the statistical significance of the difference between two means." This statement is  
A. true.  B. false.

2. What is the first step in computing Cohen's $d$?  
A. Subtract the experimental group's mean from the control group's mean.

B. Subtract the control group's mean from the experimental group's mean.

C. Divide the experimental group's mean by the control group's standard deviation.

3. What does it mean when $d = 0.50$?  
A. The average participant in the experimental group is one-half of a standard deviation higher than the average participant in the control group.  
B. The average participant in the control group is one-half of a standard deviation higher than the average participant in the experimental group.

4. "For most practical purposes, values of $d$ often exceed 10.0." This statement is  
A. true.  B. false.

5. "A small effect size might represent an important result." This statement is  
A. true.  B. false.

Answers to the Test-Item Bank

Section 1: The Empirical Approach to Knowledge


Section 2: Types of Empirical Research


Section 3: Introduction to Sampling


Section 4: Scales of Measurement


Section 5: Descriptive, Correlational, and Inferential Statistics


Section 6: Frequencies, Percentages, and Proportions


Section 7: Shapes of Distributions


Section 8: The Mean: An Average


Section 9: Mean, Median, and Mode

Section 10: Range and Interquartile Range

Section 11: Standard Deviation

Section 12: Correlation

Section 13: Pearson $r$

Section 14: Coefficient of Determination

Section 15: Scattergram

Section 16: Multiple Correlation

Section 17: Variations on Random Sampling

Section 18: Sample Size

Section 19: Standard Error of the Mean

Section 20: Introduction to the Null Hypothesis

Section 21: Decisions About the Null Hypothesis

Section 22: Introduction to the $t$ Test

Section 23: Reports of the Results of Tests

Section 24: One-Way ANOVA

Section 25: Two-Way ANOVA
Section 26: Chi-Square

Section 27: Limitations of Significance Testing

Section 28: Effect Size