1. The level of significance, α, is the probability of

    a) rejecting a false null hypothesis
    b) accepting a true null hypothesis
    c) rejecting a true null hypothesis
    d) accepting a false null hypothesis

2. If an investigator rejects the null hypothesis

    a) s/he has committed a Type II error
    b) s/he has committed a Type I error
    c) s/he has committed no error
    d) s/he may have committed a Type II error

        1) a, b, and c
        2) a and c
        3) b and d
        4) d only
        5) none of the above

3. A Type II error is

    a) the probability that the null hypothesis is true
    b) the probability that the null hypothesis is false
    c) made if the null hypothesis is accepted when it is false
    d) made if the null hypothesis is rejected when it is true
    e) none of the above

4. The p-value is

    a) the probability of the null hypothesis being true
    b) the probability of the null hypothesis being false
    c) the probability of the test statistic or any more extreme results, assuming the null hypothesis is true
    d) the probability of the test statistic or any more extreme results, assuming the null hypothesis is false
    e) none of the above

5. Significance testing and significance levels are important in the development of science because:

    a) they allow one to prove a hypothesis is false
    b) they allow one to quantify one's belief in a particular hypothesis other than the null hypothesis
    c) they allow one to quantify the likelihood of a sample result if the null hypothesis is true
    d) they allow one to quantify the likelihood of a sample result if the null hypothesis is false

6. The following are steps in the scientific method of refining our knowledge about the universe:

    a) test hypothesis by application of a test
    b) formulate a hypothesis
    c) retain or reject a hypothesis
    d) collect data

The order of these steps should be

1) d, c, b, a 2) c, b, d, a 3) a, d, b, c 4) a, b, c, d 5) b, d, a, c

7. A 95% confidence interval for the mean cholesterol level of adults over 65 years of age is (198, 208) mg/dl. The mean cholesterol level for adults 40-60 years of age is 190 mg/dl. If a two-sided hypothesis test of Ho: μ=190 mg/dl were performed, we would:

   a) accept Ho at the 5% significance level
   b) reject Ho at the 5% significance level
   c) accept Ho at the 1% significance level
   d) reject Ho at the 1% significance level
   e) can't tell

8. Investigator A claims her results are statistically significant at the 5% level. Investigator B argues that significance should be announced only if the results are statistically significant at the 1% level. From this we can conclude:

   a) it will be more difficult for investigator A to reject null hypotheses if she always works at the 5% level (compared to investigator B)
   b) it will be easier for investigator A to reject null hypotheses if she always works at the 5% level (compared to investigator B)
   c) if investigator A has significant results at the 5% level, they will also be significant at the 1% level
   d) if investigator A has significant results at the 5% level, they will never be significant at the 1% level

9. Statistical significance is synonymous with practical significance.

   True False

10. Ignoring degrees of freedom, the larger the value of the t-statistics,

    a) the larger the p-value
    b) the stronger the evidence for rejecting the null hypothesis
    c) the smaller the difference between the hypothesized and observed mean

    1) a, c 2) b, c 3) a only 4) b only

11. The 'difference is significant at the 1% level' implies

    a) there is a 99% probability that there is a real difference
    b) there is at most a 99% probability of something as or more extreme than the observed result occurring if, in fact, the null hypothesis is true
    c) the difference is significant at the .1% level
    d) the difference is significant at the 5% level

    1) a, b, c 2) a, c 3) b, d 4) d only 5) a, b, c, d

12. The 5% level of significance means:

    a) we're taking a 5% risk of misstating the null hypothesis
    b) we're taking a 5% risk that our sample is unrepresentative if the null hypothesis is true
    c) we're taking a 5% risk of getting an unrepresentative sample if the alternative hypothesis is true
    d) we're taking a 5% risk of making a wrong decision, regardless of which hypothesis is true

13. The null hypothesis will be rejected if the sample data turn out to be inconsistent with what one would expect if the null hypothesis were true.

    True False

14. Which level of significance offers the greater protection against making a Type I error?

    a) 5%
    b) 1%
    c) α

15. In any single application of the hypothesis testing procedure, it is not possible for the researcher to make both a Type I error and a Type II error at the same time.

    True False

16. Iron-deficiency anemia is an important nutritional health problem in the U.S. A dietary assessment was performed in 51 9 to 11 year-old males whose family were below the poverty line. The mean daily iron intake among these children was found to be 12.50 mg with a standard deviation of 4.75 mg. Suppose that the mean daily iron intake among a large population of 9-11 year-old boys from all income strata is 14.44 mg. We wish to test if the mean iron intake among the low-income boys is different from that of the boys in the general population. State the hypothesis that can be used to consider this question.

    a) H_0: $\mu = 12.50$ versus H_1: $\mu \neq 12.50$
    b) H_0: $\mu = 14.44$ versus H_1: $\mu = 12.50$
    c) H_0: $\mu = 14.44$ versus H_1: $\mu < 14.40$
    d) H_0: $\mu = 14.44$ versus H_1: $\mu \neq 14.44$
    e) H_0: $\mu < 14.44$ versus H_1: $\mu = 14.44$