1. What percent of the observations will lie above the mean plus two standard deviations?
    a. 5%
    b. 2.5%
    c. 95%

    The correct answer is 2.5%.
    95% of the observations lie between plus and minus two standard deviations from the mean. Therefore, 2.5% lie over and above two standard deviations on each side of the mean.

2. A coefficient of skewness of +2.48 indicates:
    a. The mean is larger than the median
    b. The tail of the distribution is to the right
    c. All of these answers are correct

    The correct answer is All of these answers are correct.
    In a positively skewed distribution, the mean is greater than the median or mode. The coefficient of skewness (Sk) generally lies between -3 and +3, therefore an Sk of +2.48 indicates significant positive skewness.

3. If you deposit $250 a month, beginning next month, for 20 years into an account paying 7% per year, compounded monthly, how much is in your account after that last deposit?
    a. $58,205.58
    b. $308,663.09
    c. $130,231.66

    The correct answer is $130,231.66.
    On the BAII Plus, press 240 N, 7 divide 12 = I/Y, 0 PV, 250 PMT, CPT FV. On the HP12C, press 240 n, 7 ENTER 12 divide i, 0 PV, 250 PMT, FV. On the BAII Plus, make sure the value of P/Y is set to 1.
    Note that the answer is displayed as a negative number.

4. If you need $25,000 in 10 years, how much must you deposit today, if your money will earn 6% per year, compounded annually?
    a. $25,000
    b. $13,959.87
    c. $2,320.01

    The correct answer: $13,959.87.

    On the BAII Plus, press 10 N, 6 I/Y, 0 PMT, 25000 FV, CPT PV. On the HP12C, press 10 n, 6 i, 0 PMT, 25000 FV, PV.

    Note that the answer will be shown as a negative number.

5. Suppose you are modelling long-term interest rates, and you believe that supply of corporate debt is a major contributing factor. Suppose you believe that the probability that rates will rise if supply of corporate debt rises is 60%; if the supply of corporate debt stays constant, you believe that there is a 35% chance of increasing interest rates; if the supply of corporate debt falls, you believe that there is a 5% chance of rates increasing. You think that the likelihood of corporate debt increasing is 50%; of staying the same is 40%; of dropping is 10%. What is the unconditional probability of interest rates rising?
    a. 55.4%.
    b. 44.5%.
    c. 55.5%.

    The correct answer: 44.5%.
    We use the total probability rule: P(A), the unconditional probability, = $P(A|S_1)*P(S_1) + P(A|S_2)*P(S_3) + P(A|S_3)*P(S_3)$, where the S_i represent mutually exclusive and exhaustive events.
    So the likelihood of interest rates increasing is 0.60*0.50 + 0.35*0.40 + 0.05*0.10 = 0.30 + 0.14 + 0.005 = 0.445.
    A statistician has framed his hypothesis testing problem as:
    H0: mean = 100
    H1: mean < 100

6. Specify the region for the p-statistic which will lead to the rejection of the null at the 80% significance level.
    a. z-statistic < -0.84
    b. z-statistic > +1.19
    c. z-statistic < -1.35 or z-statistic > +1.35

    The correct answer is z-statistic < -0.84.
    The alternative is directional and to the left, we use a left-tailed test. For this, the critical value at 80% level is -0.84. -0.84 is the value above which 80% of the probability mass of the standard normal distribution lies). The rejection region is then given by z-statistic < -0.84.

7. A market survey was conducted to estimate the proportion of homemakers who could recognize the brand name of a cleanser based on the shape and colour of the container. Of the 1,400 homemakers, 420 were able to identify the brand name. Using the 0.99 degree of confidence, the population proportion lies within what interval?
    a. 0.250 and 0.350
    b. 0.268 and 0.332
    c. 0.950 and 0.997

    The correct answer is 0.268 and 0.332.
    Interval estimate can be found from $p +/- z[p(1-p)/n]^{0.5}$. Here we have n = 1400, p = 414/1400 = 0.3 and z = 2.58 (for 99%). Therefore 0.3 +/- 2.58*0.01225 and we get 0.268 and 0.332.

8. What annual interest rate, compounded annually, would cause a series of 10 deposits of $500 to accumulate to $9,000, if the first deposit is made one year from today?

a. 12.52%
b. 15.38%
c. 11.12%

The correct answer is 12.52%.
On the BAII Plus, press 10 N, 0 PV, 500 PMT, 9000 +/- FV, CPT I/Y. On the HP12C, press 10 n, 0 PV, 500 PMT, 9000 CHS FV, i. Make sure the BAII Plus has the P/Y value set to 1.

9. You have invested in a long-term, fixed deposit account earning 4% per year for 20 years, compounded annually. Your friend has invested in a similar account but one that earns 4.25% per year, compounded semi-annually. If each of you deposited $5,000, by what amount is your friend wealthier than you due to this deposit?
   a. $538
   b. $601
   c. $639

   The correct answer is $639.
   The friend's account has $5,000*(1+0425/2)^{40}$ = 11,595 at the end of 20 years. Your account has $5,000*(1.04^{20})$ = 10,956.
   The difference is $639.

10. You are examining a group of 6 companies. Their average profit margins have been 49%, 10%, 5%, 35%, 30%, and 30%. What is the range of profit margins?
    a. 49.0%.
    b. 30.0%.
    c. 44.0%.

    The correct answer: 44.0%.
    The range = the maximum value - the minimum value.
    Here, we have 49% - 5% = 44%.

11. If the hypothesized value of a parameter under the null hypothesis lies outside the confidence interval, the null hypothesis:
    a. Cannot be rejected at the corresponding significance level.
    b. Should be rejected at the corresponding significance level.
    c. None of these answers.

    The correct answer: should be rejected at the corresponding significance level.
    The confidence interval specifies the range over which the true value of the estimated parameter can lie without rejecting the null hypothesis at the given level of significance.

12. What sample statistic is used to estimate a population value?
    a. Point estimate
    b. Parameter
    c. Interval estimate

The correct answer is Point estimate.

The point estimate is the estimate of a particular value in the population.

13. What is the area under the normal curve for z > 1.79?
    a. 0.4633
    b. 0.9599
    c. 0.0367

    The correct answer is 0.0367.
    From the z-tables, z = 1.79 is 0.4633. So 1 - 0.4633*2 = 0.0734.
    Since it is on each side of the curve, 0.0734/2 = 0.0367.

14. Type I error refers to the event that we will:
    a. Reject the null when it is true.
    b. Fail to reject the null when it is false.
    c. Reject the alternative when it is true.

    The correct answer is Reject the null when it is true.
    Remember that the null hypothesis is the one that you maintain to be true unless there is sufficient evidence to prove otherwise.
    Therefore, the first type of mistake that can happen is that you reject the maintained hypothesis when in fact, it is true. This error is referred to as "Type I" error.
    On the other hand, you may not have sufficient evidence to disprove the null when in fact, it is false. This failure to appropriately reject the null is referred to as "Type II" error.

15. You are faced with a counting problem in which you must choose k objects from n total objects. The order of choosing does not matter. The counting method you should use is:
    a. The binomial formula.
    b. The multinomial formula.
    c. The multiplication rule.

    The correct answer is The binomial formula.
    The combination, or binomial formula, gives the number of ways that k objects can be chosen from n items, without regard to the order of choosing.
    The formula is ${}_nC_k$ = (n choose k) = n! / [k! *(n-k)!].

16. In a statistical regression estimation, the R-square is found to be 39% and the slope coefficient is -0.3. The percentage of variance of the dependent variable not explained equals _____.
    a. 0.30
    b. 0.61
    c. 0.09

    The correct answer is 0.61.

The R-square of the regression measures the amount of variance of the dependent variable explained by the independent variable.
This is given to be 39%. Hence, the amount not explained equals 100% - 39% = 61%.

17. A bell-shaped, symmetrical frequency distribution has a mean of 10. If 16% of the observations in the distribution are negative, what is the coefficient of variation of X?
    a. 1.0
    b. 0.32
    c. 10.0

    The correct answer is 1.

    The fraction of observations which are less than zero equals 16% i.e. the fraction of observations which are less than (mean - 10) equals 16% (given).

    Since the distribution is symmetrical about the mean, this implies that the fraction of observations which are more than (mean + 10) also equals 16%. Thus, the fraction of the observations lying between 0 and 20 equals 1-0.16-0.16 = 0.68.

    For a bell-shaped, symmetrical frequency distribution, 68% of the observations lie within one standard deviation of the mean. Hence, the standard deviation of the distribution equals 10.
    The coefficient of variation is then equal to standard deviation/mean = 10/10 = 1.

18. A population consists of all the weights of all defensive tackles on 's football team. They are: Johnson, 204 pounds; Patrick, 215 pounds; Junior, 207 pounds; Kendron, 212 pounds; Nicko, 214 pounds; and Cochran, 208 pounds. What is the population standard deviation (in pounds)?
    a. About 4
    b. About 40
    c. None of these answers

    The correct answer is About 4.
    Population variance = (Sum of squared deviation from the mean)/N. The mean is 210.
    Population variance = (36 + 25 + 9 + 4 + 16 + 4)/6 = 94/6 = 15.67. Population standard deviation is the square root of the population variance = 3.958.

19. Sweetwater & Associates write weekend trip insurance at a very nominal charge. Records show that the probability that a motorist will have an accident during the weekend and file a claim is 0.0005. Suppose they wrote 400 policies for the coming weekend, what is the probability that exactly two claims will be filed?
    a. 0.0164
    b. 0.0001
    c. None of these answers

    The correct answer is 0.0164.
    This is a binomial probability.

The probability of getting r successes out of n trials where the probability of success each trial is p and probability of failure each trial is q (where q = 1-p) is given by: $n!(p^r)[q^{(n-r)}]/r!(n-r)!$.
Here n = 400, r = 2,p = 0.0005 and q = 0.9995. Therefore we have
400!(0.0005^2)(0.9995^398)/2!398! = 0.0164.

20. The semiannually compounded rate is 10% quoted on an annualized basis. The equivalent annually compounded rate is:
    a. 10.5%
    b. 9.65%
    c. 10.1%

    The correct answer is 9.65%.
    To solve such problems, think about investing a dollar for a year. The final amount should be the same under both the quotations.
    Under annually compounded rate, r, $1 grows to 1+r in 1 year. Under semiannual compounding, it grows to $(1+0.1/2)^2 = 1.1025$.
    Since these two should be equal, we get 1+r = 1.1025, giving r = 10.25%.
    Note that the annually compounded rate must be larger than the semiannually rate, ruling out 9.65 automatically.