Final - Monday, December 12, 2005 - Answers

1. c. About 2.0.
2. c. P(11) = 3/36.
3. b. $116
4. c. 0.0490
5. a. 10.5%
6. b. For data that approximately follow a normal distribution, about 68% of the individual observations can be found within 2 standard deviations of the average.
7. a. 2.9
8. b. 11.33
9. d. About 0.78
10. c. About 23.2
11. d. A confidence interval consists of the following critical parts: the lower value, upper value, confidence level and population parameter.
12. a. One should avoid to have line graphs start far above 0.
13. b. Minimizing the confidence level.
14. b. The population mean is 8.
15. d. Reject the null hypothesis at the 1% level of significance.
16. b. A randomized block design.
17. a. The population standard deviation is known.
18. d. Excel can produce incorrect square root, exp, and log results.
19. d. All of the above.
20. d. The means do not differ.

21. xbar +/- z_alpha * s / sqrt(n)
22. (i) New Orleans, La. (ii) Chicago, Il.
23. (i) -0.6218 (ii) -0.7380
24. z = (6.3 - 5) / (2 / sqrt(144)) = 7.8
25. sample proportion phat = 46 / 59 = 0.78 = 78%
    se(phat) = sqrt(phat * (1 - phat) / n) = sqrt(0.78 * 0.22 / 59) = 0.054
    95% CI: phat +/- 2 * se(phat) = 0.78 +/- 2 * 0.054 = [0.672, 0.888],
    i.e., between 67.2% and 88.8%.
26. Murphy, Perry, Jones, Krall, and Manzitti
27. (i) Error df = Total df - Factor df = 26 - 3 = 23
    (ii) F-ratio = Factor MS / Error MS = 10944 / 4168 = 2.6257
28. (i) t = (13.88 - 14) / (0.24 / sqrt(16)) = -2 (ii) df = 15
    (iii) use: Graphing t-Distribution Calculator
    set: degrees of freedom = 15
    determine: Area left of -2 = 0.032
    p-value = 2 * 0.032 = 0.064
29. (i) 2 (ii) 15
30. df = n1 + n2 - 2 = 28 + 34 - 2 = 60
31. (i) (98.105 - 98.6) / (0.699 / sqrt(65)) = -5.71
    (ii) use: Graphing Normal z-Score/Probability Calculator
    set: mean = 0, std dev = 1
    determine: Area left of -5.71 = 0.0000
    p-value = approx 0
32. use: Graphing Normal z-Score/Probability Calculator
    set: mean = 0.35, std dev = 0.477 / sqrt(700) = 0.0180
    determine: Area left of 0.36 = 0.7107; Area left of 0.30 = 0.0027
    Area between 0.30 and 0.36 = 0.7107 - 0.0027 = 0.7080
33. (i) 20% (ii) 5
34. (i) slope = 1.5 (ii) 11 ounces

35. (i) t = 5.3 / 0.76 = 6.97 (ii) df = 6 - 2 = 4
(iii) use: Graphing t-Distribution Calculator
set: degrees of freedom = 4
determine: Area right of 6.97 = 0.0011
p-value = 2 * 0.0011 = 0.0022

Using WebStat:

36. (i) 372.2 (ii) 356 (iii) 22

37. H0: There are no differences in the population mean sales on toys stored at different heights vs. Ha: The population mean sales on toys stored at different heights are different for two or more heights.

38. The p-value is 0.0144 (which obviously is < 0.05). This means, we reject the null hypothesis, i.e., there is a significant difference in the population mean sales on toys stored at different heights for two or more heights.

39. The p-value is 0.0316 (which obviously is < 0.05). This means, we reject the null hypothesis, i.e., there is a significant difference in the population mean sales on toys stored at Height1 vs. toys stored at Height2. More precisely, population mean sales are higher for Height1 than for Height2 (apparently children more easily can access toys located at Height1).

40. The p-value is 0.1809 (which obviously is > 0.05). This means, we fail to reject the null hypothesis, i.e., there is no significant difference in the population mean sales on toys stored at Height2 vs. toys stored at Height3 (apparently both heights are too heigh for children and it makes no difference for parents at which of these heights the toys are stored).