PLSC-724 - ANSWERS FOR PRACTICE TEST ONE

1. The normal curve becomes flatter as σ^2 increases and becomes more `peaked` as σ^2 decreases.

2. The statistic estimates the parameter.

3. Type I Error = 100 *α%. Decreasing σ from .05 to .01 decreases *P*(Type I Error).

4. Cost and lack of material

5. b) increase

6. The probability of committing a Type II Error.

7. 1) Increase n
   2) Decrease your estimate of σ^2.

8. Your ability to detect the alternate hypothesis when it is true.

9. Increase n (the number of observations)

10. a)Select a problem.
    b) Define the objectives.
    c) Define the population.

11. a)Unit of material to which one unit a of treatment is applied.
    b) A pen; 20
    c) exp. error t(r-1)=15
    sampling error tr(s-1)=60
    total 79
    d) 16

12. The mean of a population of values.

13. The soil.

14. Answer different for everyone.

15. a) Preliminary
    b) Demonstration
    c) Critical

16. Choice of experimental design or use of covariance, or size and shape of experimental units.

17. To obtain a valid estimate of experimental error and to increase precision.

18. Cost

19. Among

20. Square

21. As r increases, the $s_{\bar{Y}}$ decreases inversely as the $\sqrt{r}$.

22. The variation among observations on experimental units treated alike.

23. The variation among observations on samples within experimental units.

24. Experimental error will be the variation among observations within treatment 1 and treatment 2.

	Rep 1	Rep 2	Rep 3
Trt 1	28	31	34
Trt 2	20	18	21

25. Provide an unbiased estimate of experimental error.
Provide an unbiased estimate of treatment effects.

26. Samples do not affect randomization.

27. a) Y...
1. Yi..

28. 1.4

29. b, c, d

30. Null hypothesis: $\mu_a = \mu_b + 10$
Alternate hypothesis: $\mu_a > \mu_b + 10$

31. Accept the null hypothesis.

32. The null hypothesis should be accepted.

33. $t * s_{\bar{Y}_1} - s_{\bar{Y}_2}$ standard error of the difference of two means = LSD

34. LSD does not take into consideration the number of treatments in the experiment. Tukey's procedure does consider the number of treatments in the experiment. The basis

of Tukey's procedure is that as the number of treatments in an experiment increases, the likelihood that means will be similar decreases. Thus, the Significant Range Statistics values used in calculating the T_α-value increase as the number of treatments increases to off-set the decreasing likelihood of means being similar.

35. 4.0

36. 15

37. One-tail test.

38. a) When the experimental units are uniform.
b) When the number of treatments is small.

39. Are the experimental units uniform?

40. $Y_{ijk} = \mu + \tau_i + \varepsilon_{ij} + \lambda_{ijk}$.
a) μ = overall mean
b) τ = treatment effect-deviation of treatment mean from the overall mean
c) ε = random variation among observation on experimental units treated alike
d) λ = random variation among samples within experimental units

41. $\sqrt{s^2\left(\frac{1}{r_i}+\frac{1}{r_{i'}}\right)}$

42. a) 10 b) 30 c) 15 d) 9 e) Variation among samples within experimental units

43. df for sample error = 20, the denominator = 8.

44.

SOV	Df	SS	MS	*F*
Treatment	4	600	150	3.0
Exp. Error	15	750	50	
Samp. Error	40	900		
Total	59	2259		

45. $TreatmentSS = \frac{306^2}{4}+\frac{153^2}{3}+\frac{165^2}{5}-\frac{624^2}{12}$

46. -19

47. -7

48. 9

49. 4.71

50. $s^2_{\bar{Y}} = 20$, $s^2_{Y_1 - Y_2} = 40$, and $s^2_{Y_1 - Y_2}$ is used in calculating the LSD.

51. 20

52. $Y_{ijk} = \mu + \tau_i + \varepsilon_j + \delta_{ijk}$

53. Variation among observations on experimental units treated alike.

54. Each treatment repeated the same number of times;

$$\sum \frac{Y_{i.}^2}{r} - \frac{Y_{..}^2}{rxt}$$

Each treatment repeated unequal number of times;

$$\sum \frac{Y_{i.}^2}{r_i} - \frac{Y_{..}^2}{\sum r_i}$$

55.

T1	T2	T3	T4	T5
9	4.5	5.75	8.5	10.5
9	4.5	5.75	8.5	10.5
9	4.5	5.75	8.5	10.5
9	4.5	5.75	8.5	10.5
36	18	23	34	42

56. -1.9

57. -7

58. 27

59. The normal curve becomes flatter as σ^2 increases and becomes more `peaked` as σ^2 decreases.

60. Population 2, Population 2

61. Parameter characterize a population and statistics characterize parameters.

62. mean - arithmetic average
median - central value
mode - most frequently observed value

63. Mean

64. Variance

65. SSR values increase as p increases to account for the fact that the probability of means being the same decreases as p increases.

66.

Treatment	n	Mean
A	5	2.3 a
B	7	2.7 b
C	5	2.9 b

67. a) 18 b) the *F*-test was significant at the 95% level of confidence, and c) 18.7%

68. Precision is measured with the formula: Information=$1/\sigma_Y^2$

69. a) decrease the variance and b) increase n.

70. Design should be chosen to minimize natural variation between experimental units so that differences between treatments are due to "true" differences between treatments. Also, the design affects error df. This can affect your likelihood of detecting differences between treatments.

71. We do not calculate the LSD unless the *F*-test for treatments is significant.

72. a) provide an estimate of the variance, b) increase the precision of the experiment, c) increase the scope of the experiment, d) control the error variance by grouping similar experimental units together.