

STAT 3332 Statistics for Life Sciences

Fall 2007

Quiz 4

Your Name (Please **PRINT**):

Your *Signature*:

1. Suppose that a random sample of size $n = 7$ from a distribution F is

4 20 24 27 28 40 44

For the null hypothesis H_0 : “median of $F = 30$ ”, the *sign test statistic* S is

- (A) $40 + 44 = 84$
 (B) $1 + 1 = 2$
 (C) $4 + 20 + 24 + 27 + 28 - 40 - 44 = 19$
 (D) $-1 - 1 - 1 - 1 - 1 + 1 + 1 = -3$

2. Suppose that independent random samples from two distributions F and G are

From F : 8 20 21 27 42
 From G : 0 19 26 28 60 61

For testing $H_0 : F = G$, the *Wilcoxon rank sum test statistic* W is

- (A) $8 + 20 + 21 + 27 + 42 = 118$
 (B) $2 + 4 + 5 + 7 + 9 = 27$
 (C) $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 = \frac{11 \times 12}{2} = 66$

3. Consider *categorical data* in the 3×2 contingency table (with row totals, column totals, and the grand total shown in **bold**)

19	14	9	42
5	10	6	21
24	24	15	63

For the (1, 2) cell with *observed count* $O_{12} = 14$, the *estimated expected count* is $\hat{E}_{12} =$

14 $\frac{24+42}{63}$ $\frac{24-42}{63}$ $\frac{24 \times 42}{63}$ 63

4. (Continuation) For testing homogeneity or independence, the test statistic $\sum_{cells} (O_{ij} - \hat{E}_{ij})^2 / \hat{E}_{ij}$ has approximate distribution *chi square* with degrees of freedom (encircle)

6 - 1 = 5 $(3 - 1) \times (2 - 1) = 2$ 0 6 63

5. An interval estimate of $\mu_1 - \mu_2$ is to be constructed based on $\bar{X}_1 - \bar{X}_2$ and sample variances s_1^2 and s_2^2 from independent samples of sizes n_1 and n_2 from $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$, respectively, with σ_1^2 and σ_2^2 unknown. The most appropriate estimator of $\text{Var}(\bar{X}_1 - \bar{X}_2)$ to use is (encircle)

$\frac{s_1^2 + s_2^2}{n_1 + n_2}$ $\frac{s_1^2}{n_1} - \frac{s_2^2}{n_2}$ $\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}$ $\frac{s_1^2}{n_1} \times \frac{s_2^2}{n_2}$