STAT 3332 Statistics for Life Sciences

Spring 2007

Quiz 4

Your Name (Please **PRINT CLEARLY**):

Your *Signature*:

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1. Suppose that the ordered values of a random sample of size $n = 8$ from a continuous and symmetric distribution F are

$$8 \quad 20 \quad 21 \quad 27 \quad 42 \quad 100 \quad 101 \quad 288$$

For the null hypothesis H_0 : "median of $F = 50$", the *sign test statistic* S is (encircle best answer)

(A) $-10 + 2 + 3 + 9 + 24 = 31$

[(B)] $0 + 0 + 0 + 0 + 0 + 1 + 1 + 1 = 3$

(C) $-8 - 20 - 21 - 27 - 42 + 100 + 101 + 288 = 371$

(D) $0 + 0 + 0 + 1 + 2 + 3 + 5 = 11$

(E) $8 + 7 + 6 = 21$

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2. (Continuation) The *Wilcoxon signed rank test statistic* W^+ for this H_0 is (choose from the answers listed in Question 1)

(A) (B) (C) (D) **[(E)]**

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3. 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 63 66

For testing $H_0 : F = G$, the *Wilcoxon rank sum test statistic* W is (encircle best answer)

(A) $8 + 20 + 21 + 27 + 42 = 118$

[(B)] $2 + 4 + 5 + 7 + 9 = 27$

(C) $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 = \frac{14\times 15}{2} = 105$

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4. An interval estimate of $\mu_1 - \mu_2$ is to be constructed based on $\overline{X}_1 - \overline{X}_2$ and sample variances s_1^2 and s_2^2 from independent samples of equal size n from $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$ with σ_1^2 and σ_2^2 unknown. The most appropriate estimator of $\text{Var}(\overline{X}_1 - \overline{X}_2)$ to use is (encircle best answer)

$\frac{s_1^2}{n}$ $\frac{s_2^2}{n}$ maximum of $\frac{s_1^2}{n}$ and $\frac{s_2^2}{n}$ **[sum of $\frac{s_1^2}{n}$ and $\frac{s_2^2}{n}$]** $\frac{s_1^2}{n} \times \frac{s_2^2}{n}$

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5. (Continuation) In the same problem, but with normality of the populations *not assumed*, the most appropriate estimator of $\text{Var}(\overline{X}_1 - \overline{X}_2)$ to use is (encircle best answer)

$\frac{s_1^2}{n}$ $\frac{s_2^2}{n}$ difference of $\frac{s_1^2}{n}$ and $\frac{s_2^2}{n}$ **[sum of $\frac{s_1^2}{n}$ and $\frac{s_2^2}{n}$]** $\frac{s_1^2}{n} \times \frac{s_2^2}{n}$
