

**Question #22****Key: C**

The likelihood function is  $L(\alpha, \theta) = \prod_{j=1}^{200} \frac{\alpha \theta^\alpha}{(x_j + \theta)^{\alpha+1}}$  and its logarithm is

$l(\alpha, \theta) = 200 \ln(\alpha) + 200\alpha \ln(\theta) - (\alpha + 1) \sum_{i=1}^{200} \ln(x_i + \theta)$ . When evaluated at the hypothesized values of 1.5 and 7.8, the loglikelihood is  $-821.77$ . The test statistic is  $2(821.77 - 817.92) = 7.7$ . With two degrees of freedom (0 free parameters in the null hypothesis versus 2 in the alternative), the test statistic falls between the 97.5<sup>th</sup> percentile (7.38) and the 99<sup>th</sup> percentile (9.21).