

## Question #4

**Key: A**

The distribution function is  $F(x) = \int_1^x \alpha t^{-\alpha-1} dt = -t^{-\alpha} \Big|_1^x = 1 - x^{-\alpha}$ . The likelihood function is

$$\begin{aligned} L &= f(3)f(6)f(14)[1 - F(25)]^2 \\ &= \alpha 3^{-\alpha-1} \alpha 6^{-\alpha-1} \alpha 14^{-\alpha-1} (25^{-\alpha})^2 \\ &\propto \alpha^3 [3(6)(14)(625)]^{-\alpha}. \end{aligned}$$

Taking logs, differentiating, setting equal to zero, and solving:

$$\ln L = 3 \ln \alpha - \alpha \ln 157,500 \text{ plus a constant}$$

$$(\ln L)' = 3\alpha^{-1} - \ln 157,500 = 0$$

$$\hat{\alpha} = 3 / \ln 157,500 = .2507.$$