

## Question #196

Key: C

$$\begin{aligned}L &= \left[ \frac{f(750)}{1 - F(200)} \right]^3 f(200)^3 f(300)^4 [1 - F(10,000)]^6 \left[ \frac{f(400)}{1 - F(300)} \right]^4 \\&= \left[ \frac{\alpha 10,200^\alpha}{10,750^{\alpha+1}} \right]^3 \left[ \frac{\alpha 10,000^\alpha}{10,200^{\alpha+1}} \right]^3 \left[ \frac{\alpha 10,000^\alpha}{10,300^{\alpha+1}} \right]^4 \left[ \frac{10,000^\alpha}{20,000^\alpha} \right]^6 \left[ \frac{\alpha 10,300^\alpha}{10,400^{\alpha+1}} \right]^4 \\&= \alpha^{14} 10,200^{-3} 10,000^{13\alpha} 10,300^{-4} 10,750^{-3\alpha-3} 20,000^{-6\alpha} 10,400^{-4\alpha-4} \\&\propto \alpha^{14} 10,000^{13\alpha} 10,750^{-3\alpha} 20,000^{-6\alpha} 10,400^{-4\alpha}, \\ \ln L &= 14 \ln \alpha + 13\alpha \ln(10,000) - 3\alpha \ln(10,750) - 6\alpha \ln(20,000) - 4\alpha \ln(10,400) \\&= 14 \ln \alpha - 4.5327\alpha.\end{aligned}$$

The derivative is  $14/\alpha - 4.5327$  and setting it equal to zero gives  $\hat{\alpha} = 3.089$ .