Question #61
Answer is A

Because the exponential distribution is memoryless, the excess over the deductible is also exponential with the same parameter. So subtracting 100 from each observation yields data from an exponential distribution and noting that the maximum likelihood estimate is the sample mean gives the answer of 73.

Working from first principles,

$$L(\theta)=\frac{f(x_1)f(x_2)f(x_3)f(x_4)f(x_5)}{[1-F(100)]^5}=\frac{\theta^{-1}e^{-125/\theta}\theta^{-1}e^{-150/\theta}\theta^{-1}e^{-165/\theta}\theta^{-1}e^{-175/\theta}\theta^{-1}e^{-250/\theta}}{(e^{-100/\theta})^5}$$

$$=\theta^{-5}e^{-365/\theta}.$$

Taking logarithms and then a derivative gives

$$l(\theta)=-5\ln(\theta)-365/\theta,\ l'(\theta)=-5/\theta+365/\theta^2=0.$$

The solution is $\hat{\theta}=365/5=73$.