Q2.2
1 Point

Derive the Fisher information for λ. For the given data, compute the estimated standard error of the MLE $\hat{\lambda}$.

$$I_n(\lambda) = n \, E\left[\left(\frac{d}{d\lambda} \log \lambda e^{-\lambda x}\right)^2\right]$$

$$= n \, E\left[\left(\frac{d}{d\lambda} \log \lambda + \frac{d}{d\lambda} - \lambda x\right)^2\right] =$$

$$= n \, E\left[\left(\frac{1}{\lambda} - X\right)^2\right]$$

$$= n \, E\left[(X - \bar{x})^2\right] = n \frac{1}{\lambda^2} = \frac{n}{\lambda^2}$$

$$\text{est of se} = \sqrt{1 / I_n(\hat{\lambda})} = \sqrt{\frac{\lambda^2}{n}} = \frac{\hat{\lambda}}{\sqrt{n}}$$