1. Consider RIS of size $n$ from a distribution with the following pdf

$$\frac{\exp\left(-\frac{(x-\theta)^2}{2\lambda\theta^2 x}\right)}{\sqrt{2\pi\lambda x^3}} \qquad \text{when} \quad x > 0$$

and where $\theta > 0$ and $\lambda > 0$. Find

   (a) the MM estimators of $\theta$ and $\lambda$,
   (b) their respective asymptotic variances and correlation coefficient,
   (c) two sufficient statistics for estimating these parameters,
   (d) the ML estimators of $\theta$ and $\lambda$,
   (e) their respective asymptotic variances and correlation coefficient.
   (f) assuming a RIS of size 200 and using the large-$n$ approximation, compute the probability that the relative error of the ML estimator of $\theta$ will be less than 12%.

2. Consider RIS of size $n$ from a distribution with the following pdf

$$\frac{\theta\lambda^\theta}{x^{\theta+1}} \qquad \text{when} \quad x > \lambda$$

where $\theta > 0$ and $\lambda > 0$. Find

   (a) two sufficient statistics for estimating these parameters,
   (b) the ML estimators of $\theta$ and $\lambda$.

3. Consider the following RIS: 4.25, 5.32, 0.79, 5.45, 3.00, 0.66, 1.42, 2.57, 6.46, 6.72, 0.93, 6.95, 6.45, 2.28, 4.12, 0.86, 2.01, 5.49, 4.05, 6.52, 3.13, 0.33, 4.59, 5.84, 3.27, 3.79, 3.68, 1.88, 3.13, 0.98 from a distribution with a pdf given by

$$\frac{\lambda x^{\lambda-1}\exp\left(-(\frac{x}{\theta})^\lambda\right)}{\theta^\lambda} \qquad \text{when } x > 0$$

and where $\theta > 0$ and $\lambda > 0$. Find

   (a) the ML *estimates* of $\theta$ and $\lambda$,
   (b) the respective standard errors and the corresponding correlation coefficient.