ST102 Class 13 – Additional exercises

1. Let $\{X_1, X_2, \ldots, X_n\}$ be a random sample of size n from the pf:

$$p(x; \pi) = \begin{cases} \pi^x (1 - \pi)^{1-x} & \text{for } x = 0, 1 \\ 0 & \text{otherwise.} \end{cases}$$

   Find the method of moments estimator of π.

2. Let $\{X_1, X_2, \ldots, X_n\}$ be a random sample of size n from the pdf:

$$f(x; \theta) = \begin{cases} 2x/\theta^2 & \text{for } 0 \leq x \leq \theta \\ 0 & \text{otherwise.} \end{cases}$$

   Find the method of moments estimator of θ.

3. Suppose a probability distribution has a mean and variance given by $\mathrm{E}(X) = k\theta$ and $\mathrm{Var}(X) = k\theta^2$, respectively. Find the method of moments estimators of k and θ using a random sample of $\{X_1, X_2, \ldots, X_n\}$ drawn from this probability distribution.

   (You may use the method of moments estimators of μ and σ^2 derived in lectures.)