MATH 2F82   Assignment 5

1. Using the method of moments, find an estimator for θ (positive) of the following distribution:

$$f(x) = \frac{3x^2}{\theta} \exp(-\frac{x^3}{\theta}) \qquad \text{where} \qquad x > 0$$

   Optional (and hard): Compute the expected value of the resulting estimator. Is it fully or only asymptotically unbiased?

2. Continuation: Using the same distribution, find the maximum-likelihood estimator of θ. Also, verify that the resulting estimator is unbiased and compute its efficiency.

3. Using the method of moments, find estimators of the two parameters, say $k > 0$ and $m > 0$, of the BETA distribution.

4. Continuation: Set up equations for the corresponding maximum-likelihood estimators (you may not be able to solve them analytically).

5. Continuation: Using the following random independent sample of size 20 from a BETA distribution, evaluate (numerically) both sets of estimators (as we know, the resulting values are called estimates):

   .67, .43, .28, .54, .18, .29, .74, .85, .21, .22, .46, .75, .40, .27, .36, .26, .48, .79, .57, .19