Continuous Random Variables – 2022 GCE Statistics Further Math A Y542

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   The continuous random variable X has probability density function

   $$f(x) = \begin{cases} kx^n & 0 \leqslant x \leqslant 1, \\ 0 & \text{otherwise,} \end{cases}$$

   where k is a constant and n is a parameter whose value is positive.

   It is given that the median of X is 0.8816 correct to 4 decimal places.

   Ten independent observations of X are obtained.

   Find the expected number of observations that are less than 0.8. [8]