

The continuous random variable X has probability density function f given by

$$f(x) = \begin{cases} kx^3 & 0 \leq x < 1, \\ k(5-x) & 1 \leq x \leq 5, \\ 0 & \text{otherwise,} \end{cases}$$

where k is a constant.

(a) Sketch the graph of f . [1]

(b) Show that $k = \frac{4}{33}$. [2]

(c) Find the cumulative distribution function of X . [3]

(d) Find the median value of X . [4]