

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

$$f(x) = \begin{cases} \frac{3}{8} \left(1 + \frac{1}{x^2} \right) & 1 \leq x \leq 3, \\ 0 & \text{otherwise.} \end{cases}$$

(a) Find $E(\sqrt{X})$. [3]

The random variable Y is given by $Y = X^2$.

(b) Find the probability density function of Y . [4]

(c) Find the 40th percentile of Y . [3]