

The continuous random variable X has cumulative distribution function F given by

$$F(x) = \begin{cases} 0 & x < 0, \\ \frac{1}{81}x^2 & 0 \leq x \leq 9, \\ 1 & x > 9. \end{cases}$$

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

(b) Find $\text{Var}(\sqrt{X})$. [2]

(c) The random variable Y is given by $Y^3 = X$. Find the probability density function of Y . [3]