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

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

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

(b) Find $\mathrm{Var}\left(\sqrt{X}\right)$. [2]

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