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

$$\mathrm{f}(x) = \begin{cases} \frac{1}{8} & 0 \leqslant x < 1, \\ \frac{1}{28}(8-x) & 1 \leqslant x \leqslant 8, \\ 0 & \text{otherwise.} \end{cases}$$

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

(b) Find the value of the constant a such that $\mathrm{P}(X \leqslant a) = \frac{5}{7}$. [3]

The random variable Y is given by $Y = \sqrt[3]{X}$.

(c) Find the probability density function of Y. [5]