

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

$$f(x) = \begin{cases} \frac{1}{6}(x^{-\frac{1}{3}} - x^{-\frac{2}{3}}) & 1 \leq x \leq 27, \\ 0 & \text{otherwise.} \end{cases}$$

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

The random variable  $Y$  is defined by  $Y = X^{\frac{1}{3}}$ .

- (b)** Find the probability density function of  $Y$ . [3]

- (c)** Find the exact value of the median of  $Y$ . [2]