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

$$\mathrm{F}(x) = \begin{cases} 0 & x < 0, \\ \frac{1}{60}(16x - x^2) & 0 \leqslant x \leqslant 6, \\ 1 & x > 6. \end{cases}$$

(a) Find the interquartile range of X. [4]

(b) Find $\mathrm{E}(X^3)$. [4]

The random variable Y is such that $Y = \sqrt{X}$.

(c) Find the probability density function of Y. [3]