

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

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

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

**(b)** Find  $E(X^3)$ . [4]

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

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