

The continuous random variable X has distribution function given by

$$F(x) = \begin{cases} 0 & x < 0, \\ \frac{1}{90}(x^2 + x^4) & 0 \leq x \leq 3, \\ 1 & x > 3. \end{cases}$$

The random variable Y is defined by $Y = X^2$.

(i) Find the probability density function of Y . [4]

(ii) Find the mean value of Y . [2]