

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

$$f(x) = \begin{cases} \frac{3}{28} \left(e^{\frac{1}{2}x} + 4e^{-\frac{1}{2}x} \right) & 0 \leq x \leq 2 \ln 3, \\ 0 & \text{otherwise.} \end{cases}$$

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

The random variable Y is defined by $Y = e^{\frac{1}{2}(X)}$.

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

- (c) Find the 30th percentile of Y . [3]

- (d) Find $E(Y^4)$. [2]