

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

$$f(x) = \begin{cases} a + \frac{1}{5}x & 0 \leq x < 1, \\ 2a - \frac{1}{5}x & 1 \leq x \leq 2, \\ 0 & \text{otherwise,} \end{cases}$$

where a is a constant.

- (a) Find the value of a . [3]
- (b) Find $E(X^2)$. [2]
- (c) Find the cumulative distribution function of X . [3]