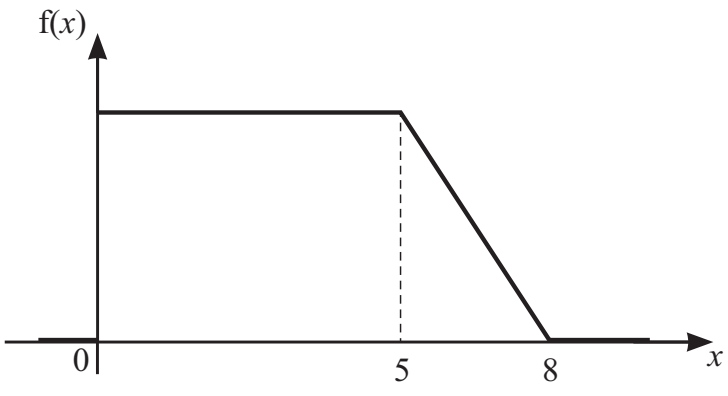
2



As shown in the diagram, the continuous random variable X has probability density function f given by

$$f(x) = \begin{cases} a & 0 \leqslant x \leqslant 5, \\ b - cx & 5 \leqslant x \leqslant 8, \\ 0 & \text{otherwise,} \end{cases}$$

where a, b and c are constants.

(a) Show that $a = \frac{2}{13}$ and find the values of b and c. [3]

(b) Find the mean of X. [3]

(c) Find the median of X. [2]

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

(d) Find the cumulative distribution function for Y. [4]