The continuous random variable X has probability density function given by

$$\mathrm{f}(x) = \begin{cases} \frac{1}{20}\left(3 - \frac{1}{\sqrt{x}}\right) & 1 \leqslant x \leqslant 9, \\ 0 & \text{otherwise.} \end{cases}$$

The random variable Y is defined by $Y = \sqrt{X}$.

(i) Show that the probability density function of Y is given by

$$\mathrm{g}(y) = \begin{cases} \frac{1}{10}(3y - 1) & 1 \leqslant y \leqslant 3, \\ 0 & \text{otherwise.} \end{cases}$$

[7]

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