3. The continuous random variable Y has the following probability density function

$$f(y) = \begin{cases} \frac{6}{25}(y-1) & 1 \leqslant y < 2 \\ \frac{3}{50}(4y^2 - y^3) & 2 \leqslant y < 4 \\ 0 & \text{otherwise} \end{cases}$$

(a) Sketch $f(y)$

(2)

(b) Find the mode of Y

(3)

(c) Use algebraic integration to calculate $E(Y^2)$

(4)

Given that $E(Y) = 2.696$

(d) find $Var(Y)$

(2)

(e) Find the value of y for which $P(Y \geqslant y) = 0.9$
Give your answer to 3 significant figures.

(4)

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Question 3 continued

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(Total for Question 3 is 15 marks)

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