3. The random variable X has a continuous uniform distribution over the interval $[-k, 5k]$ where $k > 0$

(a) Find, in terms of k, the probability density function of X for all values of x

(2)

(b) Sketch the graph of the probability density function of X

(2)

(c) Find the mean of X in terms of k

(1)

(d) Find, in terms of k, the cumulative distribution function of X for all values of x

(4)

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

(e) Find $E(Y)$ in terms of k

(3)

(f) Find the exact probability that $Y < 2k^2$
Show your working clearly.

(3)

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Question 3 continued

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Question 3 continued

(Total for Question 3 is 15 marks)