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**2** The continuous random variable $X$ has cumulative distribution function given by

$$F(x) = \begin{cases} 0 & x < -k \\ \dfrac{x+k}{4k} & -k \leqslant x \leqslant 3k \\ 1 & x > 3k \end{cases}$$

where $k$ is a positive constant.

(a) Specify fully, in terms of $k$, the probability density function of $X$

**(2)**

(b) Write down, in terms of $k$, the value of $E(X)$

**(1)**

(c) Show that $\text{Var}(X) = \dfrac{4}{3}k^2$

**(2)**

(d) Find, in terms of $k$, the value of $E(3X^2)$

**(3)**

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**Question 2 continued**

**Q2**

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