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6. The random variable X has probability density function $f(x)$ where

$$f(x) = \begin{cases} \frac{1}{8}(x^2 + 2x + 1) & -1 \leqslant x < 1 \\ \frac{1}{4} & 1 \leqslant x \leqslant \frac{11}{3} \\ 0 & \text{otherwise} \end{cases}$$

Given that $E(X) = \frac{31}{18}$

(a) use algebraic integration to find $\text{Var}(X)$

(4)

(b) Calculate $P\left(X < -\frac{1}{2}\right) + P\left(X > \frac{1}{2}\right)$

(4)

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Q6

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TOTAL FOR PAPER: 75 MARKS

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