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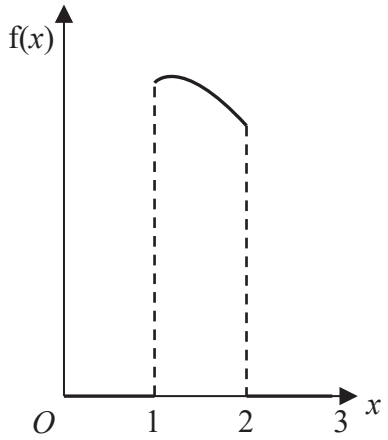


Figure 1

Figure 1 shows a sketch of the probability density function f(x) of the random variable X.

For $1 \leqslant x \leqslant 2$, f($x$) is represented by a curve with equation $f(x) = k\left(\frac{1}{2}x^3 - 3x^2 + ax + 1\right)$ where k and a are constants.

For all other values of x, f(x) = 0

(a) Use algebraic integration to show that $k(12a - 33) = 8$

(4)

Given that $a = 5$

(b) calculate the mode of X.

(4)

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Question 1 continued

Q1

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