

Further Mathematics: **9231 Mathematics - Further November 2025 Question Paper** 44

4 The random variable X takes values 1 and 2 with probabilities $\frac{2}{5}$ and $\frac{3}{5}$ respectively.

(a) Write down the probability generating function $G_X(t)$ of X .

[1]

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The random variable Y is the sum of four independent observations of X .

(b) Find the probability generating function $G_Y(t)$ of Y . Give your answer in the form $G_Y(t) = at^m(b+ct)^n$, where a, b, c, m and n are constants to be determined. [2]

[2]

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(c) Use $G_Y(t)$ to find $P(Y = 6)$. [2]

[2]

[illegible]

(d)

[5]

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