Example question

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Question

Given the bivariate distribution (X, Y) defined as

$f(x, y) = \frac{\lambda y^2}{\sqrt{2\pi}} e^{-(\frac{1}{2}+\lambda x)y^2}$ on $x > 0, y \in \mathbb{R}$

show the marginal distribution f_X is given by

$f_X(x) = \frac{\lambda}{2\sqrt{2}(\frac{1}{2}+\lambda x)^{\frac{3}{2}}}$