D/3 18

$(xy'-1)\ln x = 2y$

$y' x\ln x - 2y = \ln x$

$\int \frac{dx}{x\ln x} = \left| \begin{matrix} u = \ln x \\ du = \frac{dx}{x} \end{matrix} \right| = \int \frac{du}{u} = \ln(\ln x)$

a) $y' x\ln x - 2y = 0$

$\frac{dy}{dx} x\ln x = 2y \Leftrightarrow \frac{dy}{2y} = \frac{dx}{x\ln x} \Leftrightarrow \frac{\ln y}{2} = \ln(\ln x) + C(x)$

$\sqrt{y} = \ln x \cdot C(x) \Rightarrow y = \ln^2 x \cdot C^2(x)$

Сканировано с CamScanner

б) $y' = \frac{2}{x}\ln x \cdot C^2(x) + 2\ln^2 x\, C(x)\, C'(x)$

$\left(\frac{2}{x}\ln x\, C^2(x) + 2\ln^2 x\, C(x) C'(x)\right) x\ln x - 2\ln^2 x\, C^2(x) = \ln x$

$2x\ln^2 x\, C(x)\, C'(x) = 1$

$2x\ln^2 x\, C(x) \cdot \frac{dC}{dx} = 1$

$C(x)\, dC(x) = \frac{dx}{2x\ln^2 x}$

$\int \frac{dx}{2x\ln^2 x} = \left| \begin{array}{l} u = \ln x \\ du = \frac{dx}{x} \end{array} \right| = \int \frac{du}{2u^2} = -\frac{1}{2} \cdot \frac{1}{u} = -\frac{1}{2\ln x}$

$\frac{C^2 x}{2} = -\frac{1}{2\ln x} + C_1 \Leftrightarrow C^2(x) = -\frac{1}{\ln x} + C_1$

Теперь б в а

$y = \ln x\left(-\frac{1}{\ln x} + C_1\right) = C_1 \ln x - 1$