The variables x and y satisfy the differential equation

$$\frac{\mathrm{d}y}{\mathrm{d}x} = x\mathrm{e}^{y-x},$$

and $y = 0$ when $x = 0$.

(a) Solve the differential equation, obtaining an expression for y in terms of x. [7]

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(b) Find the value of y when $x = 1$, giving your answer in the form $a - \ln b$, where a and b are integers. [1]

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