H26

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(1) $\frac{1}{(y+1)^2}dy = xe^{-x}dx$

$\int \frac{1}{y+1} = -(x+1)e^{-x} + c$

$\frac{1}{y+1} = (x+1)e^{-x} + C$

(2) $y'' + ay = 0$

$s^2 + a = 0$

$s = \pm\sqrt{a}\,i$

$y = c_1 \cos\sqrt{a}x + c_2 \sin\sqrt{a}x$

(3) $s^2 + 2s = 0$

$s(s+2) = 0$

$s = 0, -2$

$\eta = (Ax^2 + Bx + C)x$

$\eta' = 3Ax^2 + 2Bx + C$

$\eta'' = 6Ax + 2B$

$6Ax + 2B + 6Ax^2 + 4Bx + 4C = x^2 + x$

$\begin{cases} 6A = 1 \\ 6A + 4B = 1 \\ 2B + 4C = 0 \end{cases}$ $A = \frac{1}{6}$, $B = C = 0$

$y = c_1 + c_2 e^{-2x} + \frac{1}{6}x^3$