

$$\begin{aligned}
\Rightarrow \frac{1}{y^2 - 1} &= \frac{1}{2} \frac{1}{(y-1)} - \frac{1}{2} \frac{1}{(y+1)} \\
\Rightarrow \int \frac{1}{y^2 - 1} dy &= \int x dx \\
\Rightarrow \frac{1}{2} \int \left(\frac{1}{(y-1)} - \frac{1}{(y+1)} \right) dy &= \int x dx \\
\Rightarrow \frac{1}{2} [\text{Ln}(y-1) - \text{Ln}(y+1)] &= \frac{x^2}{2} + c_1 \\
\Rightarrow \frac{1}{2} \text{Ln} \left(\frac{y-1}{y+1} \right) &= \frac{x^2}{2} + c_1 \\
\Rightarrow \text{Ln} \frac{y-1}{y+1} &= x^2 + 2c_1 \\
\Rightarrow \text{Ln} \left(\frac{y-1}{y+1} \right) &= x^2 + c_2 \Rightarrow 2c_1 = c_2 \\
\Rightarrow \text{Ln} \left(\frac{y-1}{y+1} \right) &= \text{Ln} e^{x^2} + \text{Ln} e^{c_2} \\
\Rightarrow \text{Ln} \frac{y-1}{y+1} &= \text{Ln} e^{x^2} \cdot e^{c_2} \\
\Rightarrow \frac{y-1}{y+1} &= e^{x^2} \cdot e^{c_2} \\
\Rightarrow \frac{y-1}{y+1} &= ce^{x^2} \Rightarrow e^{c_2} = c \\
\Rightarrow y - 1 &= c ye^{x^2} + ce^{x^2} \\
\Rightarrow y - c ye^{x^2} &= ce^{x^2} + 1 \\
y \cdot (1 - ce^{x^2}) &= ce^{x^2} + 1 \\
y &= \frac{1 + ce^{x^2}}{1 - ce^{x^2}}
\end{aligned}$$