

Solve the initial value problem

$$\begin{cases} y' = 8x^3e^{-2y}, \\ y(1) = 0. \end{cases}$$

1. SOLUTION

It is a separable equation, thus

$$\int 2e^{2x} dy = \int 16x^3 dx + c,$$

which leads to

$$e^{2x} = 4x^4 + c.$$

By imposing the initial condition we recover $c = -3$. Finally,

$$y(x) = \frac{1}{2} \ln(4x^4 - 3).$$