

Quiz 9: Section 9.1, Problem 35

Solve the following initial value problem:

$$\frac{dy}{dt} = ye^{-t}, \quad y(0) = 1$$

We separate:

$$\begin{aligned}\frac{1}{y} dy &= e^{-t} dt \\ \ln |y| &= -e^{-t} + C\end{aligned}$$

Since we know $y(0) = 1$, then $\ln(1) = -e^0 + C$, which means that $C = 1$. Therefore, we have

$$\begin{aligned}\ln |y| &= -e^{-t} + C \\ y &= e^{-e^{-t} + C}\end{aligned}$$