

Quiz 3 MTH 335 Fall 2025

Thursday, September 4, 2025

11:09 AM

$$\begin{cases} y' = e^{-y}(5t-2) \\ y(3)=7 \end{cases}$$

separable!

So separate variables:

$$\int \underbrace{\frac{1}{e^{-y}}}_{=e^y} dy = \int 5t-2 dt$$

$=e^y$

$$e^y = \frac{5}{2}t^2 - 2t + C$$

↓ take ln

$$y = \ln\left(\frac{5}{2}t^2 - 2t + C\right)$$

Apply IC:

$$7 = y(3) = \ln\left(\frac{5}{2}(3^2) - 2(3) + C\right)$$

↑ given ↑ computed

$$7 = \ln\left(\frac{45}{2} - 6 + C\right)$$

$$7 = \ln\left(\frac{33}{2} + C\right)$$

$$e^7 = \frac{33}{2} + C$$

$$C = e^7 - \frac{33}{2}$$

Thus soln to IVP is

$$y(t) = \ln\left(\frac{5}{2}t^2 - 2t + e^7 - \frac{33}{2}\right)$$