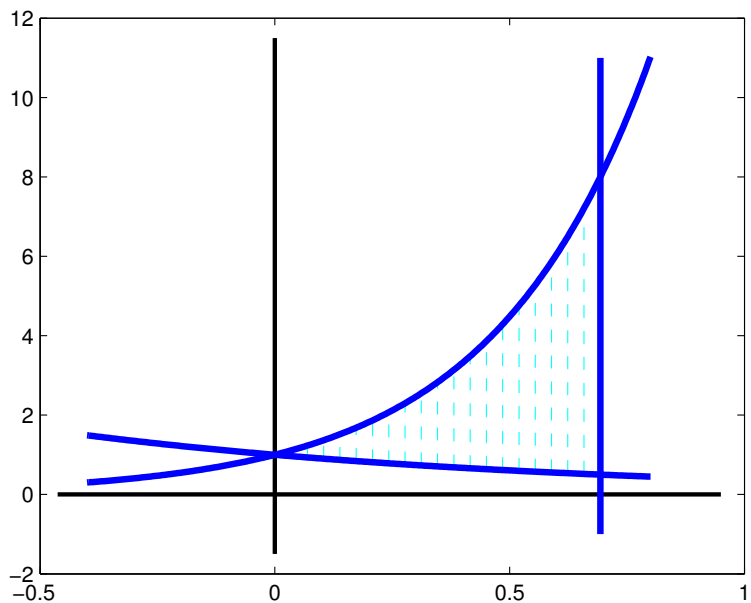


Quiz #2

SOLUTION

1. { 12 points } Sketch the region enclosed by the curves and find its area

$$y = e^{-x}, \quad y = e^{3x}, \quad x = \ln 2$$



$$\begin{aligned} \text{Area} &= \int_0^{\ln 2} e^{3x} - e^{-x} dx = \int_0^{\ln 2} e^{3x} dx - \int_0^{\ln 2} e^{-x} dx \\ &= \frac{1}{3} \int_0^{\ln 2} e^{3x} d(3x) + \int_0^{\ln 2} e^{-x} d(-x) \\ &= \frac{1}{3} e^{3x} \Big|_0^{\ln 2} + e^{-x} \Big|_0^{\ln 2} = \frac{1}{3} (e^{3 \ln 2} - e^0) + (e^{-\ln 2} - e^0) \\ &= \frac{1}{3} (2^3 - 1) + (2^{-1} - 1) = \frac{7}{3} - \frac{1}{2} = \frac{11}{6} \end{aligned}$$