Section 0.2 (15 pts)

0.2.5 (Note that "showing that $x = e^t$ is a solution" does NOT mean solving for $x(t)$. It means checking that it is a solution by substituting it back into the ODE).

0.2.8

0.2.101

0.2.102

0.2.103

0.2.5 Show that $x=e^t$ is not a solution to $x''' - 12x'' + 48x' - 64x = 0$

$x' = e^t$ $\quad e^t - 12e^t + 48e^t - 64 = 0$

$x'' = e^t$ $\quad 37e^t = 64$

$x''' = e^t$ $\quad e^t = \frac{64}{37}$

0.2.8 Verify that $x = Ce^{-2t}$ is a solution to $x' = -2x$. Find C to solve for the initial condition $x(0) = 100$

$x' = -2Ce^{-2t}$

$-2Ce^{-2t} = -2(Ce^{-2t})$

$0 = 0$ ✓

0.2.101 Show that $x = e^{-2t}$ is a solution to $x'' + 4x' + 4x = 0$

$x' = -2e^{-2t}$ $\quad 4e^{-2t} + 4(-2e^{-2t}) + 4(e^{-2t}) = 0$

$x'' = 4e^{-2t}$ $\quad 4e^{-2t} - 8e^{-2t} + 4e^{-2t} = 0$

$0 = 0$