

Name: _____

Quiz 18, Section 7.3, due on Tue 1 July

(10 pts) Use Laplace Transforms to solve the initial value problem $y'' - 4y' + 4y = t^3e^{2t}$, $y(0) = 0$, $y'(0) = 0$.

You get

$$\begin{aligned} [s^2Y(s) - 0s - 0] - 4[sY(s) - 0] + 4Y(s) &= \frac{6}{(s-2)^4} \\ (s^2 - 4s + 4)Y(s) &= \frac{6}{(s-2)^4} \\ (s-2)^2Y(s) &= \frac{6}{(s-2)^4} \\ Y(s) &= \frac{6}{(s-2)^6} = \frac{6 \cdot 5!}{5!(s-2)^6} \\ y(t) &= \frac{6}{5!}t^5e^{2t} \end{aligned}$$