

Name: _____

Quiz 16, Section 7.3, due on _____

(10 pts) Use Laplace Transforms to solve the initial value problem $y'' - 6y' + 9y = t^2 e^{3t}$, $y(0) = 0$, $y'(0) = 0$.

$$[s^2 Y(s) - 0s - 0] - 6[sY(s) - 0] + 9[Y(s)] = \frac{2}{(s-3)^3}$$

$$(s^2 - 6s + 9) Y(s) = \frac{2}{(s-3)^3}$$

$$(s-3)^2 Y(s) = \frac{2}{(s-3)^3}$$

$$Y(s) = \frac{2}{(s-3)^5} \cdot \frac{4!}{4!}$$

$$y(t) = \frac{2}{4!} t^4 e^{3t} = \frac{1}{12} t^4 e^{3t}$$