

Quiz 4 MTH 335 Fall 2025

Saturday, September 13, 2025

10:43 AM

Find general soln of

$$y' + 3t^2 y = 6t^2$$

Soln: The ODE is already in standard form, so
compute the integrating factor

$$\mu = e^{\int 3t^2 dt} = e^{t^3}$$

Mult by μ to rewrite the ODE as

$$\underbrace{e^{t^3} y' + 3t^2 e^{t^3} y}_{\text{rewrite this!}} = 6t^2 e^{t^3}$$

$$(e^{t^3} y)' = 6t^2 e^{t^3}$$

$\downarrow \int$

$$e^{t^3} y = 6 \int t^2 e^{t^3} dt$$

$$\left(\begin{array}{l} u = t^3 \\ \frac{1}{3} du = t^2 dt \end{array} \right) = \frac{6}{3} \int e^u du$$

$$= 2e^u + C$$

$$= 2e^{t^3} + C$$

\downarrow divide by e^{t^3}

$$y(t) = \frac{2e^{t^3} + C}{e^{t^3}} = 2 + Ce^{-t^3}$$