Quiz 11 MTH 140 Fall 2026

Sunday, November 8, 2026 9:21 AM

$$\begin{cases} y'(t) = t^2 - t + 2 \\ y(1) = 3 \end{cases}$$

Take D^{-1} and use property $D^{-1}y' = y$ to get

$$y(t) = D^{-1}\left[t^2 - t + 2\right] = \frac{t^3}{3} - \frac{t^2}{2} + 2t + C$$

Now use given data

$$3 = y(1) = \frac{1^3}{3} - \frac{1^2}{2} + 2(1) + C$$

(3 = given; y(1) = computed)

$$3 = \frac{1}{3} - \frac{1}{2} + 2 + C$$

$$\frac{18}{6} = \frac{2}{6} - \frac{3}{6} + \frac{12}{6} + C$$

$$\frac{18}{6} - \frac{2}{6} + \frac{3}{6} - \frac{12}{6} = C$$

$$\boxed{\frac{7}{6} = C}$$

$$\Rightarrow \boxed{y(t) = \frac{t^3}{3} - \frac{t^2}{2} + 2t + \frac{7}{6}}$$