

Problem 9

In each of Problems 7 through 14, verify that each given function is a solution of the differential equation.

$$ty' - y = t^2; \quad y = 3t + t^2$$

Solution

$$\begin{aligned} ty' - y &\stackrel{?}{=} t^2 \\ t \frac{d}{dt}(3t + t^2) - (3t + t^2) &\stackrel{?}{=} t^2 \\ t(3 + 2t) - 3t - t^2 &\stackrel{?}{=} t^2 \\ 3t + 2t^2 - 3t - t^2 &\stackrel{?}{=} t^2 \\ t^2 &= t^2 \end{aligned}$$

The solution is verified.