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

\[ ty' - y \overset{?}{=} t^2 \]
\[ t \frac{d}{dt}(3t + t^2) - (3t + t^2) \overset{?}{=} t^2 \]
\[ t(3 + 2t) - 3t - t^2 \overset{?}{=} t^2 \]
\[ 3t + 2t^2 - 3t - t^2 \overset{?}{=} t^2 \]
\[ t^2 = t^2 \]

The solution is verified.