ANSWER on Question #69658 – Math – Differential Equations

QUESTION

The general solution of equation

$$\frac{dy}{dx} - y = 2(1 - x)$$

is

$$y(x) = 2x + C \cdot e^x.$$

Find the particular solution satisfied by $x = 0, y = 0$.

SOLUTION

To find a particular solution it is necessary to substitute the corresponding values into the general solution and solve for the constant C:

$$\begin{cases} y(x) = 2x + C \cdot e^x \\ y(0) = 0 \end{cases} \Longrightarrow 2 \cdot 0 + C \cdot e^0 = 0$$

$$0 = 0 + C \cdot 1 \leftrightarrow C = 0 - 0 = 0 \leftrightarrow \boxed{C = 0}$$

Conclusion.

The particular solution satisfied by $x = 0, y = 0$ is

$$y(x) = 2x$$

ANSWER:

The equation

$$\frac{dy}{dx} - y = 2 \cdot (1 - x)$$

has a particular solution

$$y(x) = 2x \text{ if } y(0) = 0$$

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