

Answer on Question #69469 – Math – Differential Equations

Question

1. Suppose $y = 2e^{-4x}$ is the solution to initial value problem $y' + ky = 0, y(0) = y_0$.

Find the value of y_0 .

Solution

1. Construct a characteristic equation:

$$t + k = 0; t = -k.$$

2. The general solution of the differential equation:

$$y = Ce^{-kx}.$$

3. We know that $y(0) = y_0$:

$$y(0) = Ce^0 = C$$

4. So $y(0) = C$, $y = 2e^{-4x}$ is the solution to initial value problem. Therefore, $y_0 = 2$.

Answer: $y_0 = 2$.