Answer on Question #69642 – Math – Differential Equations

Question

Solve completely the differential equation $\frac{d^2y}{dx^2} - a^2y = 0$.

Solution

We have that $y'' - a^2y = 0$ is a differential equation of the second order with constant coefficients. Then the characteristic equation has the form

$$k^2 - a^2 = 0.$$

Thus $k_1 = a$ and $k_2 = -a$.

Hence the general solution of the equation is

$$y = C_1e^{-ax} + C_2e^{ax}.$$

Answer: $y = C_1e^{-ax} + C_2e^{ax}$.