27. $y''_{xx} + ae^{\lambda x}y = 0, \qquad \lambda \neq 0.$

Solution:

$$y = C_1 J_0(z) + C_2 Y_0(z), \qquad z = 2\lambda^{-1}\sqrt{a}\, e^{\lambda x/2},$$

where C_1 and C_2 are arbitrary constants, $J_0(z)$ and $Y_0(z)$ are the Bessel functions.

Reference

Polyanin, A. D. and Zaitsev, V. F., *Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition*, Chapman & Hall/CRC, Boca Raton, 2003.