

44.
$$y_{xx}'' + 2fy_x' + (f^2 + f_x')y = 0$$
, $f = f(x)$.

Solution:

$$y = (C_2x + C_1)\exp\left(-\int f \, dx\right).$$

Reference

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

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http://eqworld.ipmnet.ru/en/solutions/ode/ode0244.pdf