

44.
$$y'_x = -\frac{\alpha}{m}y + y^k f(x)g(e^{\alpha x}y^m)$$
.

The substitution $z = e^{\alpha x}y^m$ leads to a separable equation:

$$z_x' = m \exp \left[\frac{\alpha}{m} (1-k)x\right] f(x) z^{\frac{k+m-1}{m}} g(z).$$

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/ode0144.pdf