

46.
$$[e^{\alpha x}f(y)+a\beta]y'_x+e^{\beta y}g(x)+a\alpha=0.$$

Solution:

$$\int e^{-\beta y} f(y) \, dy + \int e^{-\alpha x} g(x) \, dx - a e^{-\alpha x - \beta y} = C,$$

where C is an arbitrary constant.

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/ode0146.pdf