



First-Order Partial Differential Equations > Linear Equations > Section 1.3

$$7. \quad ax \frac{\partial w}{\partial x} + by \frac{\partial w}{\partial y} = f(x, y)w.$$

General solution:

$$w = \exp \left[\frac{1}{a} \int \frac{1}{x} f(x, u^{1/a} x^{b/a}) dx \right] \Phi(u), \quad \text{where } u = y^a x^{-b}.$$

In the integration, u is considered a parameter; $\Phi(u)$ is an arbitrary function.

Reference

Polyanin, A. D., Zaitsev, V. F., and Moussiaux, A., *Handbook of First Order Partial Differential Equations*, Taylor & Francis, London, 2002.