

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

1.
$$a\frac{\partial w}{\partial x} + b\frac{\partial w}{\partial y} = f(x)w$$
.

General solution:

$$w = \exp\left[\frac{1}{a}\int f(x) dx\right]\Phi(bx - ay),$$

where $\Phi(u)$ 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.

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http://eqworld.ipmnet.ru/en/solutions/fpde/fpde1301.pdf