

First-Order Partial Differential Equations > Quasilinear Equations > Section 2.1

7.
$$ay \frac{\partial w}{\partial x} + bx \frac{\partial w}{\partial y} = f(w)$$
.

General solution for ab > 0:

$$\int \frac{dw}{f(w)} = \frac{1}{\sqrt{ab}} \ln \left| \sqrt{ab} \, x + ay \right| + \Phi \left(ay^2 - bx^2 \right),$$

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/fpde2107.pdf