

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

9. 
$$ay^n \frac{\partial w}{\partial x} + bx^k \frac{\partial w}{\partial y} = f(w)$$
.

General solution:

$$a \int \frac{dw}{f(w)} = \int \left(\frac{b}{a} \frac{n+1}{k+1} x^{k+1} - u\right)^{-\frac{n}{n+1}} dx, \qquad u = \frac{b}{a} \frac{n+1}{k+1} x^{k+1} - y^{n+1}.$$

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

## 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/fpde2109.pdf