

First-Order Partial Differential Equations > Nonlinear Equations > Section 3.1

4.
$$\frac{\partial w}{\partial x} + a \left(\frac{\partial w}{\partial y} \right)^2 = f(x)y + g(x)$$
.

Complete integral:

$$w = \varphi(x)y + \int \left[g(x) - a\varphi^2(x)\right] dx + C_1$$
, where $\varphi(x) = \int f(x) dx + C_2$,

 C_1 and C_2 are arbitrary constants.

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/fpde3104.pdf