

First-Order Partial Differential Equations > Quasilinear Equations > Section 2.3

9. 
$$\frac{\partial w}{\partial x} + [f(w) + yg(x)] \frac{\partial w}{\partial y} = h(x)$$
.

General solution:

$$yG(x)-\int G(x)f\big(H(t)-H(x)+w\big)\,dx=\Phi\big(w-H(x)\big),$$

where  $G(x) = \exp\left[-\int g(x) \, dx\right]$ ,  $H(x) = \int h(x) \, dx$ , and  $\Phi(u)$  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/fpde2309.pdf