



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

$$2. \quad \frac{\partial w}{\partial x} + aw \frac{\partial w}{\partial y} = f(y).$$

General solution:

$$x = \pm \int_{y_0}^y \frac{dz}{\sqrt{2aF(z) - 2aw}} + \Phi(u), \quad \text{where} \quad F(y) = \int f(y) dy, \quad u = F(y) - \frac{1}{2}aw^2,$$

$\Phi(u)$ 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.