



First-Order Partial Differential Equations > Linear Equations > Section 1.2

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

General solution:

$$w = \int h(x) dx + \Phi(u),$$

where $\Phi(u)$ is an arbitrary function,

$$u = e^{-F} y^{1-k} - (1-k) \int e^{-F} g(x) dx, \quad F = (1-k) \int f(x) dx.$$

Reference

Polyanin, A. D., Zaitsev, V. F., and Moussiaux, A., *Handbook of First Order Partial Differential Equations*, Taylor & Francis, London, 2002.