24. $F\left(ax+by,\ \dfrac{\partial w}{\partial x},\ \dfrac{\partial w}{\partial y},\ w-x\dfrac{\partial w}{\partial x}-y\dfrac{\partial w}{\partial y}\right)=0.$

Complete integral:

$$w = C_1 x + C_2 y + \varphi(\xi), \quad \xi = ax + by,$$

where C_1 and C_2 are arbitrary constants, and the function $\varphi(\xi)$ is determined by solving the nonlinear ordinary differential equation $F\left(\xi,\ a\varphi'_\xi + C_1,\ b\varphi'_\xi + C_2,\ \varphi - \xi\varphi'_\xi\right) = 0$.

Reference

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

