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22. $F\left(x, \dfrac{\partial w}{\partial x}, \dfrac{\partial w}{\partial y}, w - y\dfrac{\partial w}{\partial y} \right) = 0.$

Complete integral:

$$w = C_1 y + \varphi(x),$$

where C_1 is an arbitrary constant and the function $\varphi(x)$ is determined from the ordinary differential equation $F\left(x, \varphi'_x, C_1, \varphi \right) = 0$.

References

Kamke, E., *Differentialgleichungen: Lösungsmethoden und Lösungen, II, Partielle Differentialgleichungen Erster Ordnung für eine gesuchte Funktion*, Akad. Verlagsgesellschaft Geest & Portig, Leipzig, 1965.

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

http://eqworld.ipmnet.ru/en/solutions/fpde/fpde3322.pdf