**14. $f(x) + g(y) = Q(z)$, where $z = \varphi(x) + \psi(y)$.**

Here, one of the two functions $f(x)$ and $\varphi(x)$ is prescribed and the other is assumed unknown, also one of the functions $g(y)$ and $\psi(y)$ is prescribed and the other is unknown, and the function $Q(z)$ is assumed unknown. (In similar equations with a composite argument, it is assumed that $\varphi(x) \not\equiv \text{const}$ and $\psi(y) \not\equiv \text{const}$.)

Solution:

$$f(x) = A\varphi(x) + B, \quad g(y) = A\psi(y) - B + C, \quad Q(z) = Az + C,$$

where $A$, $B$, and $C$ are arbitrary constants.

## Reference

**Polyanin, A. D. and Zaitsev, V. F.,** *Handbook of Nonlinear Partial Differential Equations (Supplement S.5.5)*, Chapman & Hall/CRC Press, Boca Raton, 2004.

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