

52.
$$y(x) - y(\omega(x)) = f(x)$$
, where $\omega(\omega(x)) = x$.

The function f(x) is assumed to satisfy the condition $f(x) = -f(\omega(x))$. Solution:

$$y(x) = \frac{1}{2}f(x) + \Phi(x, \omega(x)),$$

where $\Phi(x, z) = \Phi(z, x)$ is any symmetric function of two arguments.

Reference

Polyanin, A. D. and Manzhirov, A. V., *Handbook of Integral Equations: Exact Solutions (Supplement. Some Functional Equations)* [in Russian], Faktorial, Moscow, 1998.

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