

3.
$$y^{2n+1}(x) + y^{2n+1}(a-x) = b$$
, $n = 1, 2, \ldots$

The substitution $w(x) = y^{2n+1}(x)$ leads to the linear equation 15 of Subsection 1.1: w(x) + w(a-x) = b.

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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http://eqworld.ipmnet.ru/en/solutions/fe/fe2203.pdf