8. $\boldsymbol{y\big(y(x)\big) - x = 0.}$

1°. Particular solutions:

$$y_1(x) = x, \qquad y_2(x) = C - x, \qquad y_3(x) = \frac{C}{x}, \qquad y_4(x) = \frac{C_1 - x}{1 + C_2 x},$$

where C, C_1, and C_2 are arbitrary constants.

2°. Particular solutions of this functional equation can be defined in implicit form with the algebraic (or transcendental) equation

$$\Phi(x, y) = 0,$$

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

3°. General solution in parametric form:

$$x = \Theta_1(t) + \Theta_2(t)\sin(\pi t),$$
$$y = \Theta_1(t) - \Theta_2(t)\sin(\pi t),$$

where $\Theta_1(x)$ and $\Theta_2(x)$ are arbitrary periodic functions with unit period, $\Theta_k(x) = \Theta_k(x+1)$, $k = 1,\ 2$.

Reference

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

