10. $\boldsymbol{F\big(x, y(\sin x), y(\cos x)\big) = 0}$**.**

On substituting $\frac{\pi}{2} - x$ for x, we obtain $F\big(\frac{\pi}{2} - x,\ y(\cos x),\ y(\sin x)\big) = 0$ On eliminating $y(\cos x)$ from this equation and the original one, we arrive at an ordinary algebraic (or transcendental) equation of the form $\Psi\big(x, y(\sin x)\big) = 0$, the solution of which presents no difficulty.

The solution of the original functional equation, $y = y(x)$, is determined parametrically by the system of three algebraic (transcendental) equations

$$F(t,\ y,\ w) = 0, \qquad F\big(\tfrac{\pi}{2} - t,\ w,\ y\big) = 0, \qquad x - \sin t = 0,$$

where t and w are the parameters.

Reference

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

