10. $f(1-x)+(1-x)^{\alpha}f\left(\dfrac{y}{1-x}\right)=f(y)+(1-y)^{\alpha}f\left(\dfrac{x}{1-y}\right).$

Here, x, y, $x+y$ can assume values from zero to one, and $\alpha \neq 0,\ 1,\ 2$.

Solution:

$$f(x)=C[x^{\alpha}+(1-x)^{\alpha}-1],$$

where C is an arbitrary constant.

Reference

Aczél, J. and Dhombres, J., *Functional Equations in Several Variables*, Cambridge Univ. Press, Cambridge, 1989.

