FUNCTIONAL EQUATION

Functional Equations Satisfied By Typical Functions

any equation which specifies a function in Implicit Function

1) $f(x+y) = f(x)\cdot f(y)$ $\quad f(x) = a^x$ $\qquad f(x+y) = a^{x+y} = a^x a^y = f(x)\cdot f(y)$
2) $f(x-y) = \frac{f(x)}{f(y)}, f(x) = a^x$
3) $f(x)+f(y) = f(xy)$ is satisfied $\qquad f(x) = \log_a x$
4) $f(x)-f(y) = f\left(\frac{x}{y}\right) \qquad f(x) = \log_a x$
5) $f(x)\pm f(y) = f\left(x\sqrt{1-y^2} \pm y\sqrt{1-x^2}\right), \; f(x) = \sin^{-1} x$
6) $f(x)\pm f(y) = f\left(xy \mp \sqrt{1-x^2}\sqrt{1-y^2}\right) \qquad f(x) = \cos^{-1} x$
7) $f(x)\pm f(y) = f\left(\frac{x\pm y}{1\mp xy}\right), \qquad f(x) = \tan^{-1} x$
8) $f(x)\cdot f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right) \qquad f(x) = \pm x^n + 1$

$\{ f(x) = a_0 + a_1 x + \cdots + a_n x^n$