

X.FN	Extended functions					
g-shift	g_d	g_d^{-1}	NumTh	XFCNS	B_n	B_n^*
f-shift	$\zeta(x)$	$ $	M.FACT	e^{ix}	$(-1)^x$	$x!$
unshifted	NEXTP	PRIME?	FACTORS	FIB	AGM	LINPOL
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Prev menu https://47calc.com/doc/R47/Menus/R47v0_Menu_Weibl_page_1.pdf

Next menu https://47calc.com/doc/R47/Menus/R47v0_Menu_X-FN_page_2.pdf

Ref 1 https://47calc.com/doc/R47/Reference/R47v0_Prime_numbers.pdf

Level	Label	Type	FullName	Extended description	Category	Flag	Catalog	Default
Menu p1	X.FN	MENU	Extended functions	Extended functions (Bessel, Bernoulli, Gamma, Elliptical, Orthogonal, etcetera) ; Ref : https://47calc.com/doc/R47/Reference/R47v0_Prime_numbers.pdf	Mathematics		X.FN	
F1	NEXTP	Function (monadic)	Next prime	Next prime of the integer X ; Info : Prime numbers are calculated only if $X < 10^{308}$, or NEXTP raises Error 1 -- An argument exceeds the function domain (may depend on flag CPXRES and SPCRES)	Mathematics		NEXTP	
F2	PRIME?	Command (logical)	Primality test	Test X is a prime number (must be integer) -- see https://en.wikipedia.org/wiki/Miller%E2%80%93Rabin_primality_test ; Info : Miller-Rabin probabilistic primality test is used (25 repetitions) ; PRIME? is correct up to 3 317 044 064 679 887 385 961 980 ; above that limit there are no false negatives, but there is a very low probability of false positives (albeit no known cases)	Programming		PRIME?	
F3	FACTORS	Function (monadic)	Prime factors	Prime factors of the integer input in X ; factors are calculated in Long integer, stored as Real number (34 digits) and returned as a 2 row matrix (row 1 contains the primes, row 2 contains the powers) ; shows status, number being tested and last factor found ; interrupt by [EXIT] ; registers G, H, K are used to store the last three factors, in Long integer (register K stores the remaining number to be factorised after interrupt) -- see https://en.wikipedia.org/wiki/Pollard's_rho_algorithm ; https://en.wikipedia.org/wiki/Shanks%27s_square_forms_factorization ; Info : Pollard's rho algorithm and Shanks's square forms factorization are used ; prime factors will be accurate up to 3 317 044 064 679 887 385 961 980 ; for input values > 34 digits, the long integer factors are saved in DATA/<YYYYMMDD-HHMMSS00>.REGS.TSV ; during execution, status info may be shown: Factors: Small prime trial: p = Factors: Perfect Sq trial: p = Factors: Shanks/Pollard: n = Factors: Shanks/Pollard: n =	Integers		FACTORS	
F4	FIB	Function (monadic)	Fibonacci number	Fibonacci number n, where $n = X$ -- see https://en.wikipedia.org/wiki/Fibonacci_sequence	Mathematics		FIB	
F5	AGM	Function (dyadic)	Arithmetic geometric mean	Arithmetic geometric mean of X and Y	Mathematics		AGM	
F6	LINPOL	Function (triadic)	Linear interpolation	Linear interpolation ; also works for Complex numbers and Dates ; Info : <from> ENTER <towards> ENTER <at> (fraction) LINPOL	Mathematics		LINPOL	
ff1	$\zeta(x)$	Function (monadic)	Riemann's Zeta for real arguments	Riemann's Zeta for real arguments -- see http://mathworld.wolfram.com/RiemannZetaFunction.html	Mathematics		$\zeta(x)$	
ff2		Function (dyadic)	Parallel impedance	Parallel impedance : $(X \times Y) / (X + Y)$	Electrical engineering and characters			
ff3	M.FACT	Function (monadic)	Multiply (prime) factors	Multiply (prime) factors from a 2 row matrix in X (row 1 contains the factors, row 2 contains the powers) ; Info : E.g. use FACTORS matrix as input in X	Integers		M.FACT	
ff4	e^{ix}	Function (monadic)	Euler's formula	Rotate complex unit vector by X radians : $e^{ix} = \cos(x) + i \sin(x)$; Info : i or j displayed in stack and on soft buttons	Mathematics	CPX j	e^{ix}	
ff5	$(-1)^x$	Function (monadic)	Cosine of πx	Cosine of πx ; for complex parameter : $(-1)^x = e^{i\pi x} = \cos(\pi x) + i\sin(\pi x)$; Info : Esp. for non-integer x	Mathematics		$(-1)^x$	
ff6	$x!$	Function (monadic)	Factorial $x!$ or $\Gamma(x+1)$	For Long integers : $x!$; for Reals : $\Gamma(x+1)$; Info : Max integer: 450 (up to 1000 digits accurate) ; max real : 2123.549 956 662 463 236 31 ; integers > max are converted to reals	Mathematics		$x!$	
gf1	g_d	Function (monadic)	Gudermannian function	Gudermannian function -- see http://en.wikipedia.org/wiki/Gudermannian_function	Mathematics		g_d	
gf2	g_d^{-1}	Function (monadic)	Inverse Gudermannian function	Inverse Gudermannian function -- see http://en.wikipedia.org/wiki/Gudermannian_function	Mathematics		g_d^{-1}	
gf3	NumTh	MENU	Number theory functions	Number theory functions -- see https://en.wikipedia.org/wiki/Divisor_function	Mathematics		NumTh	

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gF4	XFCNS	MENU	Extended functions	Extended accuracy functions for compounded input from three or six consecutive registers, effectively to 1000 digits for new models and simulator, but function not available on DM42 hardware ; when working from the stack, the compound result overwrites X, Y, Z, but when working from other registers, the compound result is pushed onto the stack ; Y will contain Long integer ; when menu XFCNS is open, setting HIDE is ignored ; Split screen : Displaying $X \times Y + Z = \langle \text{value} \rangle$ and $T \times A + B = \langle \text{value} \rangle$ (or "Invalid register type/angle") when menu XFCNS is open (on new stack input, using ALL notation ; Info : extended accuracy functions are defined for (compound) real input and output only, or will result in NaN (Not a Number) or Error 31 -- Input data types do not match ; when menu XFCNS is open, if XYZ contains result in Virtual compound data type, SHOW displays $X : XY + Z = \langle \text{value} \rangle$ and ditto for T : $TA + B$ and for the dedicated triple register storage, e.g. R90 : FMA: (fused multiply-add) ; Ref : https://47calc.com/doc/R47/Reference/R47v0_Datatypes.pdf	Extended accuracy		XFCNS	
gF5	B_n	Function (monadic)	Bernoulli number (new definition)	Bernoulli number (new definition)	Mathematics		B_n	
gF6	B_n^*	Function (monadic)	Bernoulli number (old definition)	Bernoulli number (old definition)	Mathematics		B_n^*	

p1	X.FN	Link
F1	NEXTP	
F2	PRIME?	
F3	FACTORS	
F4	FIB	
F5	AGM	
F6	LINPOL	
fF1	$\zeta(x)$	
fF2	$ $	
fF3	M.FACT	
fF4	e^{ix}	
fF5	$(-1)^x$	
fF6	$x!$	
gF1	g_d	
gF2	g_d^{-1}	
gF3	NumTh	https://47calc.com/doc/R47/Menus/R47v0_Menu_NumTh_page_1.pdf
gF4	XFCNS	https://47calc.com/doc/R47/Menus/R47v0_Menu_XFCNS_page_1.pdf
gF5	B_n	
gF6	B_n^*	