GNU Calc Reference Card

(for version 2.1)

Starting and Stopping

start/stop standard Calc	`C-x * c`
start/stop X keypad Calc	`C-x * k`
start/stop either: `C-x * *`	
stop standard Calc	`q`
Calc tutorial	`C-x * t`
run Calc in other window	`C-x * o`
quick calculation in minibuffer	`C-x * q`

Getting Help

The `h` prefix key is Calc's analogue of `C-h` in Emacs.

quick summary of keys	`?`
describe key briefly	`h c`
describe key fully	`h k`
describe function or command	`h f`
read on-line manual	`h i` or `C-x * i`
read full Calc summary	`h s` or `C-x * s`

Error Recovery

abort command in progress	`C-g`
display recent error messages	`w`
undo last operation	`U`
redo last operation	`D`
recall last arguments	`M-RET`
edit top of stack	`‘`
reset Calc to initial state	`C-x * 0` (zero)

Transferring Data

grab region from a buffer	`C-x * g`
grab rectangle from a buffer	`C-x * r`
grab rectangle, summing columns	`C-x * :`
grab rectangle, summing rows	`C-x * _`
yank data to a buffer	`C-x * y`

Also, try `C-k`/`C-y` or X cut and paste.

Examples

In RPN, enter numbers first, separated by `RET` if necessary, then type the operator. To enter a calculation in algebraic form, press the apostrophe first.

	RPN style:	algebraic style:
Example:	`2 RET 3 +`	`’ 2+3 RET`
Example:	`2 RET 3 + 4 *`	`’ (2+3)*4 RET`
Example:	`2 RET 3 RET 4 + *`	`’ 2*(3+4) RET`
Example:	`3 RET 6 + Q 3 ^`	`’ sqrt(3+6)^3 RET`
Example:	`P 3 / n S`	`’ sin(-pi/3) RET =`

Arithmetic

add, subtract, multiply, divide	`+, -, *, /`
raise to a power, nth root	`^, I ^`
change sign	`n`
reciprocal $1/x$	`&`
square root $\sqrt{x}$	`Q`
set precision	`p`
round off last two digits	`c 2`
convert to fraction, float	`c F, c f`
enter using algebraic notation	`’ 2+3*4`
refer to previous result	`’ 3*$^2`
refer to higher stack entries	`’ $1*$2^2`
finish alg entry without evaluating	`LFD`
set mode where alg entry used by default	`m a`

Stack Commands

Here S_n is the nth stack entry, and N is the size of the stack.

key	no prefix	prefix n	prefix −n
RET	copy S_1	copy $S_{1..n}$	copy S_n
LFD	copy S_2	copy S_n	copy $S_{1..n}$
DEL	delete S_1	delete $S_{1..n}$	delete S_n
M-DEL	delete S_2	delete S_n	delete $S_{1..n}$
TAB	swap $S_1 \leftrightarrow S_2$	roll S_1 to S_n	roll S_n to S_N
M-TAB	roll S_3 to S_1	roll S_n to S_1	roll S_N to S_n

With a 0 prefix, these copy, delete, or reverse $S_{1..N}$.

Display

scroll horizontally, vertically	`< >, { }`
home cursor	`o`
line numbers on/off	`d l`
trail display on/off	`t d`
scientific notation	`d s`
fixed-point notation	`d f`
floating-point (normal) notation	`d n`
group digits with commas	`d g`

For display mode commands, `H` prefix prevents screen redraw and `I` prefix temporarily redraws top of stack.

Notations

scientific notation	`6.02e23`
minus sign in numeric entry	`_23` or `23 n`
fractions	`3:4`
complex numbers	`(x, y)`
polar complex numbers	`(r; θ)`
vectors (commas optional)	`[1, 2, 3]`
matrices (or nested vectors)	`[1, 2; 3, 4]`
error forms (`p` key)	`100 +/- 0.5`
interval forms	`[2 .. 5)`
modulo forms (`M` key)	`6 mod 24`
HMS forms	`5@ 30’ 0"`
date forms	`<Jul 4, 1992>`
infinity, indeterminate	`inf, nan`

Scientific Functions

$\ln$, $\log_{10}$, $\log_b$	`L, H L, B`
exponential e^x, 10^x	`E, H E`
sin, cos, tan	`S, C, T`
arcsin, arccos, arctan	`I S, I C, I T`
inverse, hyperbolic prefix keys	`I, H`
two-argument arctan	`f T`
degrees, radians modes	`m d, m r`
pi (π)	`P`
factorial, double factorial	`!, k d`
combinations, permutations	`k c, H k c`
prime factorization	`k f`
next prime, previous prime	`k n, I k n`
GCD, LCM	`k g, k l`
random number, shuffle	`k r, k h`
minimum, maximum	`f n, f x`
error functions erf, erfc	`f e, I f e`
gamma, beta functions	`f g, f b`
incomplete gamma, beta functions	`f G, f B`
Bessel J_ν, Y_ν functions	`f j, f y`
complex magnitude, arg, conjugate	`A, G, J`
real, imaginary parts	`f r, f i`
convert polar/rectangular	`c p`

Financial Functions

enter percentage	`M-%`
convert to percentage	`c %`
percentage change	`b %`
present value	`b P`
future value	`b F`
rate of return	`b T`
number of payments	`b #`
size of payments	`b M`
net present value, int. rate of return	`b N, b I`

Above computations assume payments at end of period. Use `I` prefix for beginning of period, or `H` for a lump sum investment.

straight-line depreciation	`b S`
sum-of-years’-digits	`b Y`
double declining balance	`b D`

Units

enter with units	`’ 55 mi/hr`
convert to new units, base units	`u c, u b`
convert temperature units	`u t`
simplify units expression	`u s`
view units table	`u v`

Common units:
  distance: `m, cm, mm, km; in, ft, mi, mfi; point, lyr`
  volume: `l or L, ml; gal, qt, pt, cup, floz, tbsp, tsp`
  mass: `g, mg, kg, t; lb, oz, ton`
  time: `s or sec, ms, us, ns, min, hr, day, wk`
  temperature: `degC, degF, K`

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Programmer's Functions

binary, octal, hex display	d 2, d 8, d 6
decimal, other radix display	d 0, d r
display leading zeros	d z
entering non-decimal numbers	16#7FFF
binary word size	b w
binary AND, OR, XOR	b a, b o, b x
binary DIFF, NOT	b d, b n
left shift	b l
logical right shift	b r
arithmetic right shift	b R
integer quotient, remainder	\, %
integer square root, logarithm	f Q, f I
floor, ceiling, round to integer	F, I F, R

Variables

Variable names are single digits or whole words.

store to variable	s t
store and keep on stack	s s
recall from variable	s r
shorthands for digit variables	t n, s n, r n
unstore, exchange variable	s u, s x
edit variable	s e

Vector Operations

vector of 1, 2, ..., n	v x n
vector of n counts from a by b	C-u v x
vector of copies of a value	v b
concatenate into vector	|
pack many stack items into vector	v p
unpack vector or object	v u
length of vector (list)	v l
reverse vector	v v
sort, grade vector	V S, V G
histogram of vector data	V H
extract vector element	v r
matrix determinant, inverse	V D, &
matrix transpose, trace	v t, V T
cross, dot products	V C, *
identity matrix	v i
extract matrix row, column	v r, v c
intersection, union, diff of sets	V ^, V V, V -
cardinality of set	V #
add vectors elementwise (i.e., map +)	V M +
sum elements in vector (i.e., reduce +)	V R +
sum rows in matrix	V R _ +
sum columns in matrix	V R : +
sum elements, accumulate results	V U +

Algebra

enter an algebraic formula	' 2x+3y^2
enter an equation	' 2x^2=18
symbolic (vs. numeric) mode	m s
fractions (vs. float) mode	m f
suppress evaluation of formulas	m O
simplify formulas automatically	m S
return to default evaluation rules	m D
"Big" display mode	d B
C, Pascal, FORTRAN modes	d C, d P, d F
TEX, LaTEX, eqn modes	d T, d L, d E
Unformatted mode	d U
Normal language mode	d N
simplify formula	a s
put formula into rational form	a n
evaluate variables in formula	=
evaluate numerically	N
let variable equal a value in formula	s l $x=val$
declare properties of variable	s d

Common decls: **pos**, **int**, **real**, **scalar**, $[a..b]$.

expand, collect terms	a x, a c
factor, partial fractions	a f, a a
polynomial quotient, remainder, GCD	a \, a %, a g
derivative, integral	a d, a i
taylor series	a t
principal solution to equation(s)	a S
list of solutions	a P
generic solution	H a S
apply function to both sides of eqn	a M
rewrite formula	a r

Example: a r a*b + a*c := a*(b+c)
Example: a r sin(x)^2 := 1-cos(x)^2
Example: a r cos(n pi) := 1 :: integer(n) :: n%2 = 0
Example: a r [f(0) := 1, f(n) := n f(n-1) :: n > 0]
Put rules in **EvalRules** to have them apply automatically.
Put rules in **AlgSimpRules** to apply during **a s** command.
Common markers: **opt**, **plain**, **quote**, **eval**, **let**, **remember**.

Numerical Computations

sum formula over a range	a +
product of formula over a range	a *
tabulate formula over a range	a T
integrate numerically over a range	a I
find zero of formula or equation	a R
find local min, max of formula	a N, a X
fit data to line or curve	a F
mean of data in vector or variable	u M
median of data	H u M
geometric mean of data	u G
sum, product of data	u +, u *
minimum, maximum of data	u N, u X
sample, pop. standard deviation	u S, I u S

Selections

select subformula under cursor	j s
select nth subformula	j n
select more	j m
unselect this, all formulas	j u, j c
copy indicated subformula	j RET
delete indicated subformula	j DEL
commute selected terms	j C
commute term leftward, rightward	j L, j R
distribute, merge selection	j D, j M
isolate selected term in equation	j I
negate, invert term in context	j N, j &
rewrite selected term	j r

Graphics

graph function or data	g f
graph 3D function or data	g F
replot current graph	g p
print current graph	g P
add curve to graph	g a
set number of data points	g N
set line, point styles	g s, g S
set log vs. linear x, y axis	g l, g L
set range for x, y axis	g r, g R
close graphics window	g q

Programming

begin, end recording a macro	C-x (, C-x)
replay keyboard macro	X
read region as written-out macro	C-x * m
if, else, endif	Z [, Z :, Z]
equal to, less than, member of	a =, a <, a {
repeat n times, break from loop	Z <, Z >, Z /
"for" loop: start, end; body, step	Z (, Z)
save, restore mode settings	Z ', Z '
query user during macro	Z #
put finished macro on a key	Z K
define function with formula	Z F
edit definition	Z E
record user-defined command permanently	Z P
record variable value permanently	s p
record mode settings permanently	m m