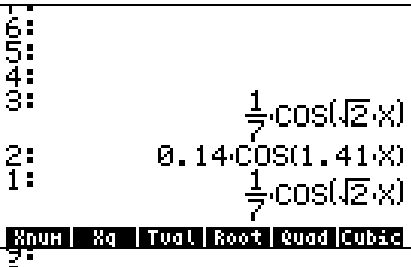
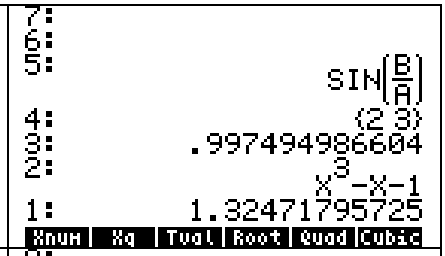
ALGEBRA

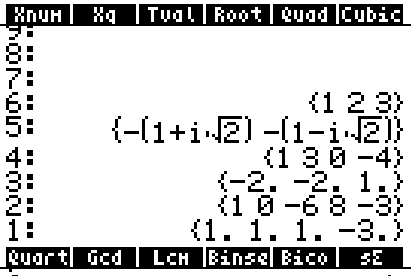
NUMERIC:
Xnum: term to numerical
Xq: num. to fractions (0.3s)

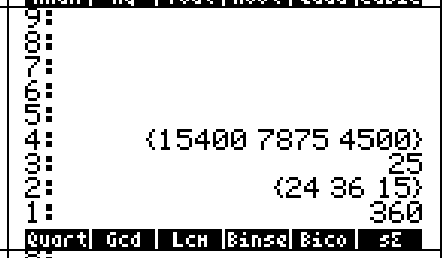
Tval: term value (0.3s)
Root: root at 0, near a (1.8s)





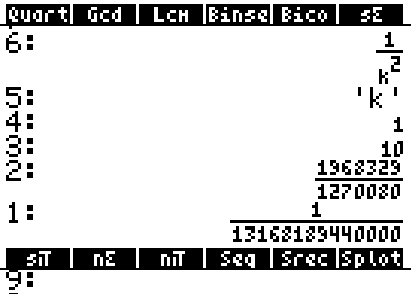
NUMERIC:
Quad: solve quadr. equation
Cubic: solve cubic equation
Quartic: quartic equation (1s)
Gcd: greatest common divisor
Lcm: least comm. mult. (0.2s)





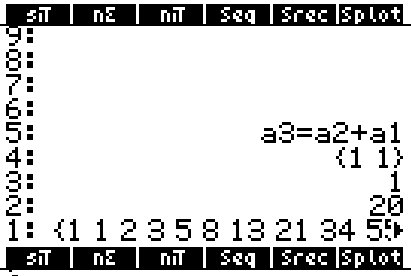
NUMERIC:
sΣ: symbolic sum (2s)
sΠ: symbolic product (2s)

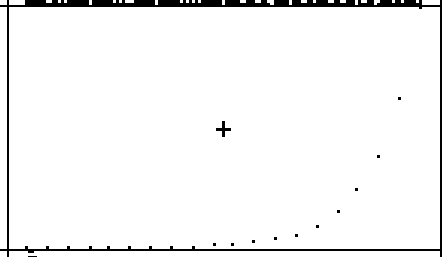
nΣ: numeric sum (0.4s)
nΠ: numeric product (0.8s)



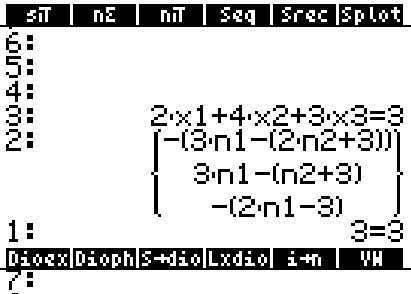
NUMERIC:
Srec: recursive sequence (3s)

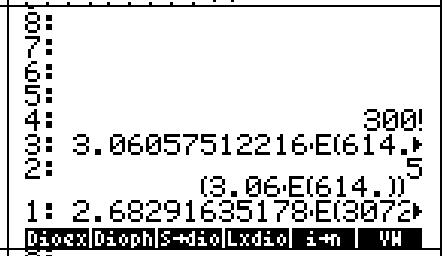
Splot: sequence plot(1s)





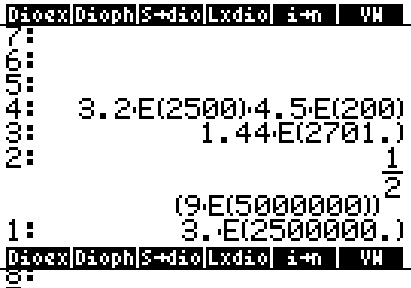
NUMERIC:
Dioph: solve diophantic equation (4s)
S->Dio: insert solution (0.3s)
i->n: long integer to large numeric (0.3s)

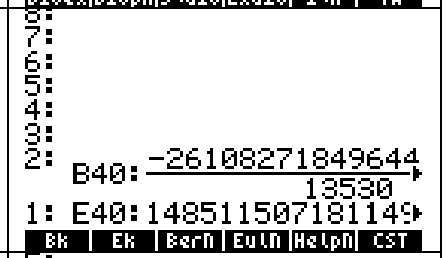




NUMERIC:
i->n: long integer to large numeric (3s)

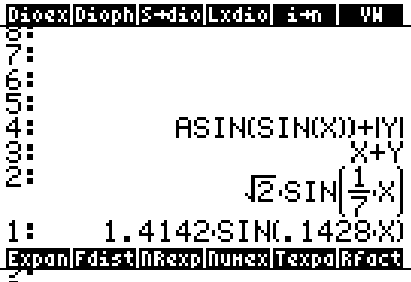
Bk: Bernoulli number (0.1s)
Ek: Euler number (0.1s)





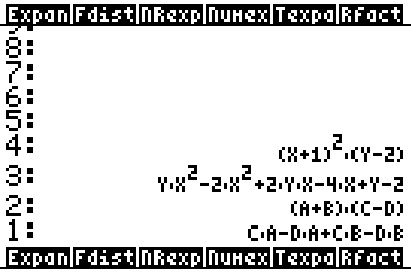
SYMBOLIC:
NRexpand: nonrig. expand (1s)
Numexpand: num. expand (0.2s)

↑Match: in matrix, lists (0.3s)



SYMBOLIC:
Fdistrib: full expansion (1s)

Powsimp: simplify powers (0.3s)



SYMBOLIC: Cfactor: complex factor (0.6s) Rfactor: real factor (1s)	2: X^3+8 1: $(X+2)\cdot(X-(1-i\cdot\sqrt{3}))\cdot(X-(1+$ Cfact NRfac Vfact Rpart Cpart Powsi	2: X^3+8 1: $(X+2)\cdot(X^2-2\cdot X+4)$ Expan Fdist NRexp Numex Texpa Rfact
SYMBOLIC: Vfactor: factor with respect to variable v (1s) Dsqrt: square root to denominator (1s)	3: $Y^2\cdot X-2\cdot Y\cdot X+X$ 2: 'X' 1: $X\cdot(Y^2-2\cdot Y+1)$ Cfact NRfac Vfact Rpart Cpart Powsi	RAD XYZ DEC ℂ= 'X' \GEBRA SYMBOLIC> USR 2: $\frac{b\cdot\sqrt{c}}{c}$ 1: $\frac{b}{\sqrt{c}}$ Dsqrt ¬Ssqr Ssqrt ↑Matc ↓Matc Rsolv
SYMBOLIC: T→V: term to variables (1s) T→(I)DV: term to (in)-dependent variables (1s) Axrpn: algebraic to RPN and back (0.4s)	6: F(X,Y)·G(Z) 5: {F G X Y Z} 4: F(X,Y)·G(Z) 3: {X Y Z} 2: F(X,Y)·G(Z) 1: {F G} T→DV Axrpn Negfr Expfr Denfr Numfr	3: $SIN(\sqrt{X}\cdot Y)$ 2: {X √ Y * SIN} 1: $SIN(\sqrt{X}\cdot Y)$ T→DV Axrpn Negfr Expfr Denfr Numfr
SYMBOLIC: Negfrac: negate fraction Expfrac: with factor, after EVAL	2: $\frac{A-B}{C-D}$ 1: $\frac{B-A}{D-C}$ T→DV Axrpn Negfr Expfr Denfr Numfr	3: $\frac{X\cdot i-1}{X\cdot i+1}$ 2: i 1: $\frac{X+i}{X-i}$ T→DV Axrpn Negfr Expfr Denfr Numfr
SYMBOLIC: Denfract: denominator Numfract: numerator Trexpand: expand trigo. term with integer n (0.9s)	4: $\frac{A}{B}$ 3: 'B' 2: $\frac{A}{B}$ 1: 'A' T→DV Axrpn Negfr Expfr Denfr Numfr	6: $COS(n\cdot\pi)$ 5: $(-1)^n$ 4: $COS(2\cdot\pi\cdot n)$ 3: 1 2: $e^{i\cdot\pi\cdot n}$ 1: $(-1)^n$ Prime Trexp Editi MULTI Helps CST
RATFCT: L↔R: list to rational function (0.3s) Radd: add rational functions Rsub: subtract rat. fct. (2.5s)	4: {{1 2} {1 2 3}} 3: $\frac{X+2}{X^2+2\cdot X+3}$ 2: {1 2 3 4} 1: $X^3+2\cdot X^2+3\cdot X+4$ Pex Rex L↔R Radd Rsub Rmul	4: {{1 2} {1 2 3}} 3: {1 2 3} 2: {{1 4 10 13 11} {1 2 3}} 1: {{-1 -4 -10 -11 -7} {1 2 3}} Pex Rex L↔R Radd Rsub Rmul
RATFCT: Rmul: multiply rational functions (1s) Rdiv: divide rational functions (1s)	3: {1 2 3} 2: {{a} {1 2}} 1: $\left\{\left\{\frac{2\cdot a}{2}\ 2\cdot a\ 3\cdot a\right\}\ \{1\ 2\}\right\}$ Pex Rex L↔R Radd Rsub Rmul	3: {{1 2} {1 2 3}} 2: {1 2 3} 1: {{1 2} {1 4 10 12 9}} Rdiv Rinv Rpart Rroot Rcoef Reval
RATFCT: Rroot: roots of numerator and denominator (0.3s) Rcoeff: roots to rat. fct. (1s) Reval: function values (1s)	3: {{1 2} {1 2 3}} 2: {{-2.} {{-1.,1.41} {-1.,-1.41}}} 1: {{1 -3 2} {1 -6 11 -6}} Rdiv Rinv Rpart Rroot Rcoef Reval	3: {{1 2} {1 2 3}} 2: {4 5 6} 1: $\left\{\frac{2}{9}\ \frac{7}{38}\ \frac{8}{51}\right\}$ Rdiv Rinv Rpart Rroot Rcoef Reval

RATFCT: Rsimp: simplify rational functions Rder: derivative (1.7s) Rint: integral (3.9s)	9: 8: 7: 6: 5: 4: 3: 2: {{2 4} {1 8 24 32 16}} 1: {{2} {1 6 12 8}} Rsimp Rder Rint Rplot nRexp Padd	7: 6: 5: 4: {{1 2} {1 2 3}} 3: {{-1 -4 -1} {1 4 10 12 9}} 2: {{1 2} {1 2 3}} 1: $\frac{\ln(x^2+2\cdot x+3)+\sqrt{2}\cdot \mathrm{atan}\left(\frac{\sqrt{2}\cdot x+\sqrt{2}}{2}\right)}{2}$ Rsimp Rder Rint Rplot nRexp Padd
HYP: Lin: hyperbolic to exp (1s) Hlin: linearize hyperbolic (1s)	7: 6: 5: 4: ACOSH(X) 3: $\ln\left(X+\sqrt{X^2-1}\right)$ 2: COSH(X) 1: $\frac{1}{2}\cdot e^{X}+\frac{1}{2}\cdot e^{-X}$ Lin Hlin Hexpa Hyp Hypsi Hypco	7: 6: 5: 4: 3: 2: $\mathrm{COSH}(X)^4$ 1: $\frac{4\cdot \mathrm{COSH}(2\cdot X)+\mathrm{COSH}(4\cdot X)+3}{8}$ Lin Hlin Hexpa Hyp Hypsi Hypco
HYP: Hlin: linearize hyperbolic Hexpand: expand hyperbolic (1s) Hyp: simplify hyperbolic (3s)	7: 6: 5: 4: $\mathrm{SINH}(X)^2$ 3: $\frac{\mathrm{COSH}(2\cdot X)-1}{2}$ 2: SINH(2·X) 1: 2·COSH(X)·SINH(X) Lin Hlin Hexpa Hyp Hypsi Hypco	8: 7: 6: 5: 4: 3: 2: $\mathrm{COSH}(X)^4-\mathrm{SINH}(X)^4$ 1: COSH(2·X) Lin Hlin Hexpa Hyp Hypsi Hypco
HYP: Hyp: convert to hyperbolic (1s)	7: 6: 5: 4: e^{X} 3: SINH(X)+COSH(X) 2: $\frac{1}{2}\cdot e^{X}+\frac{-1}{2}\cdot e^{-X}$ 1: SINH(X) Lin Hlin Hexpa Hyp Hypsi Hypco	8: 7: 6: 5: 4: $\ln\left(X+\sqrt{X^2+1}\right)$ 3: ASINH(X) 2: SIN(X) 1: −(i·SINH(i·X)) Lin Hlin Hexpa Hyp Hypsi Hypco
HYP: Hypsin: convert to sinh Hypcosh: convert to cosh (1s) Hyptanh: convert to tanh (1s)	8: 7: 6: 5: 4: $\mathrm{COSH}(X)^3$ 3: $\mathrm{COSH}(X)\cdot \mathrm{SINH}(X)^2+\mathrm{COSH}(X)$ 2: $\mathrm{SINH}(X)^4$ 1: $\mathrm{COSH}(X)^4-2\cdot \mathrm{COSH}(X)^2+1$ Lin Hlin Hexpa Hyp Hypsi Hypco	6: 5: 4: 3: 2: 1: $\frac{\mathrm{COSH}(X)^2-1}{\mathrm{TANH}(X)^2-1}$ Hypto Tr→Hy Hy→Tr Tanh2 Ash2c Ash2t
HYP: Tr→Hy: Trig to Hyp Hy→Tr: Hyp to Trig (0.4s) Tanh2sc: tanh to sinh,cosh (0.2s)	9: 8: 7: 6: 5: 4: SIN(X) 3: −(i·SINH(i·X)) 2: COSH(X) 1: COS(i·X) Hypto Tr→Hy Hy→Tr Tanh2 Ash2c Ash2t	8: 7: 6: 5: 4: 3: 2: TANH(X) 1: $\frac{\mathrm{SINH}(X)}{\mathrm{COSH}(X)}$ Hypto Tr→Hy Hy→Tr Tanh2 Ash2c Ash2t
HYP: Ash2ch: asinh to acosh (0.1s) Ash2th: asinh to atanh (0.1s) Ath2sh: atanh to asinh (0.1s) Ash2th: asinh to acosh (0.1s)	6: 5: 4: ASINH(X) 3: $\mathrm{SIGN}(X)\cdot \mathrm{ACOSH}\left(\sqrt{X^2+1}\right)$ 2: ASINH(X) 1: $\mathrm{ATANH}\left(\frac{X}{\sqrt{X^2+1}}\right)$ Hypto Tr→Hy Hy→Tr Tanh2 Ash2c Ash2t	5: 4: ATANH(X) 3: $\mathrm{SIGN}(X)\cdot \mathrm{ASINH}\left(\frac{X}{\sqrt{X^2-1}}\right)$ 2: ATANH(X) 1: $\mathrm{SIGN}(X)\cdot \mathrm{ACOSH}\left(\frac{1}{\sqrt{1-X^2}}\right)$ Ach2s Ach2t Ath2s Ath2c HelpH CST