Complex Operations

MINIMUM SIZE 005

ARITHMETIC

Key in first complex number $(x_1 + iy_1)$.
y_1 [ENTER♦] x_1 [ENTER♦]

Key in second complex number $(x_2 + iy_2)$.
y_2 [ENTER♦] x_2

+	[XEQ]	C+
−	[XEQ]	C−
×	[XEQ]	C×
÷	[XEQ]	C÷

FUNCTIONS

$\lvert z\rvert$	y_1 [ENTER♦] x_1 [XEQ] MAGZ
$1/z$	y_1 [ENTER♦] x_1 [XEQ] CINV [R/S]
z^n	y_1 [ENTER♦] x_1 [ENTER♦] n [XEQ] Z↑N [R/S]
$z^{1/n}$	y_1 [ENTER♦] x_1 [ENTER♦] n [XEQ] Z↑1/N [R/S]
e^z	y_1 [ENTER♦] x_1 [XEQ] e↑Z [R/S]
$\ln z$	y_1 [ENTER♦] x_1 [XEQ] LNZ [R/S]
a^z	y_1 [ENTER♦] x_1 [ENTER♦] a [XEQ] a↑Z [R/S]
$\log_a z$	y_1 [ENTER♦] x_1 [ENTER♦] a [XEQ] LOGZ [R/S]

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z^w	y_2 [ENTER♦] x_2 [ENTER♦] y_1 [ENTER♦] x_1 [XEQ] Z↑W [R/S]
$z^{1/w}$	y_2 [ENTER♦] x_2 [ENTER♦] y_1 [ENTER♦] x_1 [XEQ] Z↑1/W [R/S]
sin z	y_1 [ENTER♦] x_1 [XEQ] SINZ [R/S]
cos z	y_1 [ENTER♦] x_1 [XEQ] COSZ [R/S]
tan z	y_1 [ENTER♦] x_1 [XEQ] TANZ [R/S]

Hyperbolics

MINIMUM SIZE 001

sinh x	x [XEQ] SINH
cosh x	x [XEQ] COSH
tanh x	x [XEQ] TANH
$\sinh^{-1}x$	x [XEQ] ASINH
$\cosh^{-1}x$	x [XEQ] ACOSH
$\tanh^{-1}x$	x [XEQ] ATANH

Triangle Solutions

MINIMUM SIZE 008

All sides known [XEQ] SSS

Two angles and included side known
[XEQ] ASA

Two angles and adjacent side known
[XEQ] SAA

Two sides and included angle known
[XEQ] SAS

Two sides and adjacent angle known
[XEQ] SSA

After prompts are answered, results are output with successive use of [R/S] .

Coordinate Transformations

MINIMUM SIZE 025

Initialize program. [XEQ] TRANS

2-DIMENSION

Input origin and rotation angle.
x_0 [ENTER♦] y_0 [ENTER♦] θ [A]

Transform coordinates to translated-rotated system. x [ENTER♦] y [C]   [R/S]

Transform coordinates to original system
x′ [ENTER♦] y′ [E]   [R/S]

3-DIMENSION

Input origin of translated system.
x_0 [ENTER♦] y_0 [ENTER♦] z_0 ■ [A]

Input rotation vector and angle.
a [ENTER♦] b [ENTER♦] c [ENTER♦] θ ■ [B]

Transform to translated-rotated system.
x [ENTER♦] y [ENTER♦] z ■ [C] [R/S] [R/S]

Transform to original system.
x′ [ENTER♦] y′ [ENTER♦] z′ ■ [E] [R/S] [R/S]

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Matrix Operations

Initialize program. [XEQ] MATRIX

Key in order of matrix (N ≤ 14); press [R/S] .
Set size and continue.

Input elements of matrix in row order (Aij); press [R/S] .

Repeat previous step until all elements have been keyed in.

View the matrix. [XEQ] VMAT

Edit the matrix. [XEQ] EDIT

Input row and column of element to be changed
I [ENTER♦] J [R/S]

Key in new value A_{ij} [R/S]

To stop editing [R/S]   [R/S] .

Compute determinant. [XEQ] DET

Find inverse. [XEQ] INV

Press [R/S] for results in column order.

For simultaneous equations [XEQ] SIMEQ

Input column matrix. B_1 [R/S]

Press [R/S] for remaining inputs and results.

View the column. [XEQ] VCOL

Solution to f(x) = 0 on an Interval

MINIMUM SIZE 007

Key in function under desired label.
[GTO] [·] [·]
[PRGM]
[LBL] _
.
.
.
[RTN]
[PRGM]

Initialize program. [XEQ] SOLVE

Key in function name; press [R/S] .

If you wish to provide 2 guesses, key in first guess; press [R/S] .

Otherwise, press [R/S] alone.

Key in second guess; press [R/S] .

Polynomial Solutions/Evaluation

MINIMUM SIZE 023

Initialize program. [XEQ] POLY

Key in degree of polynomial (n= 2,3,4,5); press [R/S] .

Input coefficients of polynomial (a_i); press [R/S] .

Repeat previous step until display says **ROOTS?**

To find roots of polynomial, press [R/S] .

To evaluate polynomial answer no (N); press [R/S] .

Input x and press [R/S] to see f(x).

For new x, key in x, press [R/S] .

For a new polynomial of same degree, change coefficients (R_{00}-R_{04}) and [XEQ] ROOTS.

Numerical Integration

MINIMUM SIZE 008

Discrete Case

Initialize program. [XEQ] INTG

Key in spacing between x-values; press [A] .

Key in function value at x_j; press [B] . Repeat for j= 0,1, ..., n.

Compute area by trapezoidal rule. [C]

Compute area by Simpson's rule. [D]

Explicit Functions

Key in function under desired label.
[GTO] [·] [·]
[PRGM]
[LBL] _
.
.
.
[RTN]
[PRGM]

Initialize program. [XEQ] INTG

Key in beginning and final endpoints of integration interval. a [ENTER↑] b [■] [A]

Key in number of subintervals, and compute area by Simpson's rule. [■] [B] .

Key in function name; press [R/S] .

To change a, b, or n, go to the appropriate step.

Differential Equations

MINIMUM SIZE 008

Key in function
[GTO] [·] [·]
[PRGM]
[LBL] _
.
.
.
[RTN]
[PRGM]

Initialize program. [XEQ] DIFEQ

Key in function name; press [R/S] .

Key in order of differential equation (1 or 2); press [R/S] .

Key in step size; press [R/S] .

Input initial x; press [R/S] .

Input initial y; press [R/S] .

For second-order solution key in initial y'; press [R/S] .

Output successive values of x and y with [R/S] .

Fourier Series

MINIMUM SIZE 027

Initialize program. [XEQ] FOUR

Key in number of samples in one period; press [R/S] .

Key in number of frequencies desired; press [R/S] .

Key in order of first coefficient; press [R/S] .

Input y_n, n= 1,...,N; press [R/S] .

Repeat previous step until display shows **RECT?**

To display coefficients in rectangular form, press [R/S] . To display coefficients in polar form, key in N; press [R/S] . Press [R/S] to display successive coefficients.

To compute value of series at t, set USER mode, key in t, press [E] .