COSINT

PURPOSE
Compute the cosine integral.

DESCRIPTION
The cosine integral is defined as:

$$Ci(x) = \gamma + \ln(x) + \int_0^x \frac{1 - \cos(t)}{t} dt \qquad \textbf{(EQ Aux-81)}$$

where γ is Euler's constant (approximately 0.5772...). This integral is undefined for zero and it is typically defined only for positive x since $Ci(-x) = Ci(x) - i*\pi$. Note that the imaginary part is constant for all negative values. For negative x, DATAPLOT returns the value for the corresponding positive x. An error message is printed if the input value is zero.

SYNTAX
LET <y2> = COSINT(<x>)   <SUBSET/EXCEPT/FOR qualification>
where <x> is a non-zero number, variable, or parameter;
    <y2> is a variable or a parameter (depending on what <x> is where the computed cosine integral values are stored;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES
LET A = COSINT(0.1)
LET A = COSINT(-0.1)
LET Y = COSINT(X)

NOTE
DATAPLOT uses the routine SICIEI written by Irene Stegum and Ruth Zucker of NIST (see the REFERENCE section below).

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS
COSHINT	=	Compute the hyperbolic cosine integral.
SININT	=	Compute the sine integral.
SINHINT	=	Compute the hyperbolic sine integral.
EXPINTN	=	Compute the exponential integral of order N.
LOGINT	=	Compute the logarithmic integral.
DAWSON	=	Compute Dawson's integral.

REFERENCE
"SICIEI: Automatic Computing Methods for Special Functions. Part III. The Sine, Cosine, Exponential Integrals and Related Functions," Stegum and Zucker, Journal of Research of the National Bureau of Standards, 80B(2), 1976.

"Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegun, National Bureau of Standards, 1964 (chapter 5).

APPLICATIONS
Special Functions

IMPLEMENTATION DATE
94/9

PROGRAM
      TITLE AUTOMATIC
      PLOT COSINT(X) FOR X = .01 .01 5