

**SEMPDF****PURPOSE**

Compute the semi-circular probability density function.

**DESCRIPTION**

The semi-circular distribution is the distribution of the projection onto one axis of the points uniformly distributed within the unit circle. As such, it is useful for testing 2-dimensional uniformity. The semi-circular probability density function is:

$$f(x) = \sqrt{1 - x^2} \quad \text{for } -1 \leq x \leq 1 \quad (\text{EQ 8-313})$$

This distribution has mean 0 and standard deviation  $\sqrt{2/3}$ .

**SYNTAX**

LET <y2> = SEMPDF(<y1>) <SUBSET/EXCEPT/FOR qualification>  
 where <y1> is a variable, a number, or a parameter in the range -1 to 1;  
 <y2> is a variable or a parameter (depending on what <y1> is) where the computed semi-circular pdf value is stored;  
 and where the <SUBSET/EXCEPT/FOR qualification> is optional.

**EXAMPLES**

```
LET A = SEMPDF(3)
LET Y = SEMPDF(X1)
```

**DEFAULT**

None

**SYNONYMS**

None

**RELATED COMMANDS**

SEMCDF	=	Compute the semi-circular cumulative distribution function.
SEMPPF	=	Compute the semi-circular percent point function.
UNIPDF	=	Compute the uniform probability density function.
UNICDF	=	Compute the uniform cumulative distribution function.
UNIPPF	=	Compute the uniform percent point function.
NORCDF	=	Compute the normal cumulative distributing function.
NORPDF	=	Compute the normal probability density function.
NORPPF	=	Compute the normal percent point function.

**REFERENCE**

"Continuous Univariate Distributions - 2," Johnson and Kotz, Houghton Mifflin, 1970 (chapter 25).

"Simple and Robust Linear Estimation of the Location Parameter of a Symmetric Distribution," Filliben, unpublished Ph.d dissertation, Princeton University, 1969 (pp. 21-44, 229-231).

**APPLICATIONS**

Data Analysis

**IMPLEMENTATION DATE**

94/4

## PROGRAM

```
XLIMITS -1 1
XTIC OFFSET 0.1 0.1
TITLE AUTOMATIC
XILABEL X
YILABEL PROBABILITY
PLOT SEMPDF(X) FOR X = -1 0.01 1
```

