LGAPDF

PURPOSE
Compute the standard form of the log-gamma probability density function with shape parameter γ.

DESCRIPTION
The standard form of the log-gamma distribution has the following probability density function:

$$f(x, \gamma) = \frac{e^{\gamma x - e^x}}{\Gamma(\gamma)} \qquad \gamma > 0 \qquad \textbf{(EQ Aux-230)}$$

where γ is the shape parameter and Γ is the gamma function (see the documentation for the GAMMA command for details of this function).

SYNTAX
LET \<y\> = LGAPDF(\<x\>,\<gamma\>)   \<SUBSET/EXCEPT/FOR qualification\>
where \<x\> is a positive number, parameter, or variable;
    \<y\> is a variable or a parameter (depending on what \<x\> is) where the computed log-gamma pdf value is saved;
    \<gamma\> is a number or parameter that specifies the shape parameter;
and where the \<SUBSET/EXCEPT/FOR qualification\> is optional.

EXAMPLES
LET A = LGACDF(3,1.5)
LET X2 = LGACDF(X1,GAMMA)

NOTE 1
The general form of the log-gamma probability density function is:

$$f(x, \gamma, \mu, \sigma) = \frac{e^{\gamma \frac{x - \mu}{\sigma} - e^{\frac{x - \mu}{\sigma}}}}{\Gamma(\gamma)} \qquad \gamma > 0, \sigma > 0 \qquad \textbf{(EQ Aux-231)}$$

where μ is a location parameter and σ is a scale parameter.

NOTE 2
Prentice has given a reparameterized log-gamma probability density function that many analysts prefer. The pdf for this is given on page 90 of the Johnson, Kotz, and Balakrishnan book (see the Reference section below). DATAPLOT does not directly support the reparameterized form at this time.

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS
LGACDF	=	Compute the log-gamma cumulative distribution function.
LGAPPF	=	Compute the log-gamma percent point function.
GAMCDF	=	Compute the gamma cumulative distribution function.
GAMPDF	=	Compute the gamma probability density function.
GAMPPF	=	Compute the gamma percent point function.
EV1CDF	=	Compute the extreme value type 1 cumulative distribution function.
EV1PDF	=	Compute the extreme value type 1 probability density function.
EV1PPF	=	Compute the extreme value type 1 percent point function.
EV2CDF	=	Compute the extreme value type 2 cumulative distribution function.
EV2PDF	=	Compute the extreme value type 2 probability density function.
EV2PPF	=	Compute the extreme value type 2 percent point function.

REFERENCE
"Continuous Univariate Distributions - Vol. 2," 2nd. Ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (pp. 89-90).

APPLICATIONS
Extreme Value Analysis, Lifetime Analysis

IMPLEMENTATION DATE
95/10

PROGRAM
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MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
X1LABEL X
Y1LABEL PROBABILITY
.
LET GAMMA = 0.1
TITLE LOG-GAMMA PDF - GAMMA = ^GAMMA
PLOT LGAPDF(X,GAMMA) FOR X = 0.01 0.01 5
LET GAMMA = 0.5
TITLE LOG-GAMMA PDF - GAMMA = ^GAMMA
PLOT LGAPDF(X,GAMMA) FOR X = 0.01 0.01 5
LET GAMMA = 1.0
TITLE LOG-GAMMA PDF - GAMMA = ^GAMMA
PLOT LGAPDF(X,GAMMA) FOR X = 0.01 0.01 5
LET GAMMA = 2.0
TITLE LOG-GAMMA PDF - GAMMA = ^GAMMA
PLOT LGAPDF(X,GAMMA) FOR X = 0.01 0.01 5
END OF MULTIPLOT
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