# GOMPDF

## PURPOSE
Compute the Gompertz probability density function.

## DESCRIPTION
The Gompertz distribution has the following probability density function:

$$f(x, c, b) = bc^x e^{\frac{-b(c^{x-1})}{\log(c)}} \qquad x \geq 0, \ b > 0, \ c \geq 1 \qquad \textbf{(EQ Aux-185)}$$

where b and c are shape parameters.

## SYNTAX
LET <y> = GOMPDF(<x>,<c>,<b>)                          <SUBSET/EXCEPT/FOR qualification>

where <x> is a positive number, parameter, or a variable;

    <y> is a variable or a parameter (depending on what <x> is where the computed Gompertz pdf value is saved;

    <c> is a number, parameter, or variable (greater than 1) that specifies the first shape parameter;

    <b> is a positive number, parameter, or variable that specifies the second shape parameter;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

## EXAMPLES
LET A = GOMPDF(3,1.5.0.6)
LET X2 = GOMPDF(X1,ALPHA,CONST)

## NOTE 1
If c is 1, this distribution reduces to the exponential distribution. The Gompertz distribution can be interpreted as a truncated extreme value type I distribution.

## NOTE 2
There are several forms given for the Gompertz distribution in the literature. Some of these are given in Johnson, Kotz, and Balakrisnan (see the Reference section below). In particular, one common form uses the parameter $\alpha$ where $\alpha = \log(c)$. Simply replace c with EXP($\alpha$) in the pdf formula given above.

## DEFAULT
None

## SYNONYMS
None

## RELATED COMMANDS

| | | |
|---|---|---|
| GOMCDF | = | Compute the Gompertz cumulative distribution function. |
| GOMPPF | = | Compute the Gompertz percent point function. |
| EXPCDF | = | Compute the exponential cumulative distribution function. |
| EXPPDF | = | Compute the exponential probability density function. |
| EXPPPF | = | Compute the exponential percent point function. |
| EV1CDF | = | Compute the extreme value type I cumulative distribution function. |
| EV1PDF | = | Compute the extreme value type I probability density function. |
| EV1PPF | = | Compute the extreme value type I percent point function. |
| WEICDF | = | Compute the Weibull cumulative distribution function. |
| WEIPDF | = | Compute the Weibull probability density function. |
| WEIPPF | = | Compute the Weibull percent point function. |
| EV2CDF | = | Compute the extreme value type II cumulative distribution function. |
| EV2PDF | = | Compute the extreme value type II probability density function. |
| EV2PPF | = | Compute the extreme value type II percent point function. |

## REFERENCE
"Continuous Univariate Distributions,", 2nd. ed., Johnson, Kotz, and Balakrishnan, John Wiley and Sons, 1994 (pp. 25-26, 81-85).

APPLICATIONS
    Life Testing

IMPLEMENTATION DATE
    95/10

PROGRAM
    LET C1 = DATA 1.1 1.1 1.1 2 2 2 5 5 5
    LET B1 = DATA 0.5 1 2 0.5 1 2 0.5 1 2
    .
    MULTIPLOT 3 3; MULTIPLOT CORNER COORDINATES 0 0 100 100
    TITLE AUTOMATIC
    LOOP FOR K = 1 1 9
        LET C = C1(K)
        LET B = B1(K)
        X1LABEL C = ^C, B = ^B
        PLOT GOMPDF(X,C,B) FOR X = 0 0.01 5
    END OF LOOP
    END OF MULTIPLOT