

## SET CARTESIAN PRODUCT

### PURPOSE

Carry out the cartesian product of 2 sets with numeric elements.

### DESCRIPTION

The Cartesian product of two sets is the set containing all the possible element pairs of the 2 original sets. For example, the Cartesian product of the 3-element set 1 3 5 and the 4-element set 1 4 9 16 is the 12-element pair of sets:

(1,1), (1,4), (1,9), (1,16), (3,1), (3,4), (3,9), (3,16), (5,1), (5,4), (5,9), (5,16)

### SYNTAX

LET <v3> <v4> = SET CARTESIAN PRODUCT <v1> <v2> <SUBSET/EXCEPT/FOR qualification>

where <v1> is the variable containing the elements of the first set;

<v2> is the variable containing the elements of the second set;

<v3> is the variable containing the elements of the resultant set corresponding to <v1>;

<v4> is the variable containing the elements of the resultant set corresponding to <v2>;

and where the <SUBSET/EXCEPT/FOR qualification> is optional and rarely used in this context.

### EXAMPLES

LET Y3 Y4 = SET CARTESIAN PRODUCT Y1 Y2

LET Y3 Y4 = SET CARTESIAN PRODUCT Y1 Y2 SUBSET Y1 > 10

LET Y3 Y4 = SET CARTESIAN PRODUCT Y1 Y2 FOR I = 1 1 3

### NOTE

If the elements of a mathematical "set" are numbers (or can be translated into numbers-- always possible), then a DATAPLOT variable can be used to store the items of the mathematical set. To store the set with the 12 elements 1 3 5 7 11 1 4 9 16 1 8 27, form the variable Y with the following command:

LET Y = DATA 1 3 5 7 11 1 4 9 16 1 8 27

Larger sets can be created with the READ or SERIAL READ commands.

### DEFAULT

None

### SYNONYMS

None

### RELATED COMMANDS

SET CARDINALITY	=	Computes the number of elements in a set.
SET UNION	=	Carries out a set union.
SET INTERSECTION	=	Carries out a set intersection.
SET COMPLEMENT	=	Carries out a set complement.
VECTOR DOT PRODUCT	=	Carries out a vector cross product.
MATRIX MULTIPLICATION	=	Carries out a matrix multiplication.

### APPLICATIONS

Mathematics

### IMPLEMENTATION DATE

87/10

### PROGRAM

```
LET Y1 = DATA 1 3 5 7 9
LET Y2 = DATA 1 4 9 16
LET Y3 Y4 = SET CARTESIAN PRODUCT Y1 Y2
SET WRITE DECIMALS 0
WRITE Y1 Y2 Y3
```