

RELATIONS

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Relations

4 2 3 3
9 8 5 1
9 3 3 7
7 8 8 6

24

Combine a row or
column to be equal
to the red number
Use + - * / ^ SQRT ( )

```

This following program is one where you should deny yourself, and any other player, the use of paper and pencil if you really want some mental exercise.

The screen will display a four by four matrix of numbers to the left hand side. On the right hand side will be shown a number, or numbers, in red.

You have to combine two, or more, of the numbers in any of the rows to arrive at the same figure as the red number/s.

How to play

To reach your answer you may use any of the following operators:

- + plus
- minus
- * multiplication
- / division
- ^ to the power of
- SQR square root of

Example: If the red number is 1 and the row is 9 2 4 8 the solution would be

$\text{SQR}(9)+2-4$

This, followed by RETURN, would give 1 as it's answer.

Correct answers will mean that you will be asked if you wish to proceed. Answer Y or No followed by RETURN.

If you answer incorrectly, your computer will explain, and show, the correct solution.

A score sheet appears after 200 seconds which will show your results and give an IQ rating against your reasoning powers.

Programming hints

The matrix is displayed in double height, double width characters. This is done by using Mode 5 to give double width characters and then defining 20 user defined characters which consist of the top halves of the numbers 0 to 9 and the bottom halves of the numbers 0 to 9. The

pattern for the numbers 0 to 9 is found by calling the OSWORD routine with the hexadecimal number A in the accumulator (%A). The OSWORD routine is at &FFF1. See the User Guide for further details if you are not familiar with machine code or the ROM routines.

If you wish to increase the number of rows or columns of the matrix then you must change the maximum value of I (row) or J (column) in the FOR . . . NEXT loops.

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10  REM  RELATIONS
20  REM  COPYRIGHT (C) G.LUDINSKI 1983
30  REM  ON ERROR PROC_ERROR:GOTO 830
40  MODE5:VDU23;8202;0;0;0;19,1,0;0;19
, 2, 0;0;19,3,0;0;
50  DIM  A(4,4),X(16),Y(16)
60  CLS
70  REM
80  REM  CREATE DOUBLE HEIGHT CHARACTER
S
90  REM
100 A%=&A
110 X%=0:Y%=&A
120 FOR I=0 TO 9
130   ?&A00=ASC(STR$(I))
140   CALL (&FFF1)
150   VDU23,128+(2*I),?&A01,?&A01,?&A0
2,?&A02,?&A03,?&A03,?&A04,?&A04
160   VDU23,128+(2*I)+1,?&A05,?&A05,?&
A06,?&A06,?&A07,?&A07,?&A08,?&A08
170 NEXT I
180 TIME=0:NO=0:CR=0
190 REM
200 REM  GENERATE NUMBERS
210 REM
220 CLS
230 PRINT'"          Relations"'
240 PRINT'
250 IF TIME >= 20000 THEN GOTO 890
260 NO=NO+1
270 FOR I=1 TO 4
280   FOR J=1 TO 4
290     A(I,J)=RND(9)
300   NEXT J
310 NEXT I
320 REM
330 REM  DISPLAY NUMBERS
340 REM
350 COLOUR128:COLOUR2
360 FOR I=1 TO 4
370   PRINT
380   FOR T=1 TO 2
390     FOR J=1 TO 4
400       IF T=1 THEN PRINT" ";CHR$(12
8+(2*A(I,J)))
410       IF T=2 THEN PRINT" ";CHR$(12
8+(2*A(I,J))+1)
420     NEXT J
430   PRINT
440   NEXT T

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450 NEXT I
460 REM
470 REM GENERATE RED NUMBER
480 REM
490 S1=RND(2):S2=INT(RND(1)*10):SM=VAL
(STRS(S1)+STR$(S2))
500 COLOUR 1
510 PRINTTAB(13,9);CHR$(128+(2*S1));CH
R$(128+(2*S2))
520 PRINTTAB(13,10);CHR$(128+(2*S1)+1)
;CHR$(128+(2*S2)+1)
530 COLOUR3
540 REM
550 REM CHECK ANSWER
560 REM
570 PRINTTAB(0,17)"Combine a row or
column to be equal to the red number"
580 PRINT
590 PRINT"Use + - * / ^ SQRT ()"
600 VDU19,1,1;0;19,2,3;0;19,3,7;0;
610 INPUT I$
620 IF I$="" THEN PROC_ERROR:GOTO 830
630 IF EVAL(I$) <> SM THEN PRINT"NO, t
hey are not = ";SM:GOTO830
640 N$=""
650 FOR I=1 TO LEN(I$)
660 NU$=MID$(I$,I,1)
670 IF NU$ >= "0" AND NU$ <= "9" THE
N N$=N$+NU$
680 NEXT I
690 IF LEN(N$) > 4 OR LEN(N$) = 0 THEN
PROC_ERROR:GOTO830
700 SG$=""
710 FOR T=1 TO 2
720 FOR I=1 TO 4
730 SG$=SG$+"X"
740 FOR J=1 TO 4
750 IF T=1 THEN SG$=SG$+STR$(A(I
,J))
760 IF T=2 THEN SG$=SG$+STR$(A(J
,I))
770 NEXT J
780 NEXT I
790 SG$=SG$+"X"
800 NEXT T
810 IF INSTR(SG$,N$)=0 THEN PROC_ERROR
:GOTO830
820 PRINT:PRINT"Yes, you're right":CR=
CR+1
830 PRINT:PRINT"Do you want more Y/N";
840 INPUT R$
850 IF R$ <> "N" THEN GOTO220
860 REM
870 REM SCORE SHEET
880 REM
890 CLS
900 TM=TIME/100
910 PRINT"Number attempted=";NO
920 PRINT"Number correct=";CR
930 PRINT"Time taken=";INT(TM);"secs"
940 IQ=INT((CR*100)/5.3):IF IQ > 150 T
HEN IQ=150
950 PRINT"IQ lvl (reasoning)=";IQ
960 IF CR >= 7 THEN PRINT"THIS IS SUP
ERIOR (upper 10%)":END
970 IF CR = 6 THEN PRINT"THIS IS GOOD
(upper 30%)":END
980 IF CR > 4 THEN PRINT"THIS IS FAIR
(upper 60%)":END
990 GOTO1030

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1000 DEFPROC_ERROR
1010 PRINTTAB(0,26) "Error, wrong number
s "
1020 ENDPROC
1030 END
1040 REM
```

N.B. In lines 110 - 160 inclusive, you will see & and ?. Do not confuse these with numbers 8 and 7.

