



DECUS

PROGRAM LIBRARY

DECUS NO.	8-207
TITLE	Cube Root Subroutine
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DATE	April 30, 1969
SOURCE LANGUAGE	PAL

```

/
/CUBE ROOT SUBROUTINE ENTER WITH OPERAND IN AC
/
0200      *200
0200      CUBROT, 0
0201      DCA TEMP
0202      DCA ROOT
0203      DCA MAGIC
0204      STL CLA CMA
0205      DCA TALLY
0206      TAD TEMP
0207      TAD TALLY
0210      SZL
0211      JMP FINISH
0212      ISZ ROOT
0213      DCA TEMP
0214      TAD M6
0215      TAD MAGIC
0216      DCA MAGIC
0217      TAD MAGIC
0220      TAD TALLY
0221      CLL CML
0222      JMP CBX
0223      FINISH, CLA CLL
0224      TAD ROOT
0225      JMP I CUBROT

/RETURN ADDRESS STORAGE
/STORE OPERAND
/ZERO ROOT COUNTER
/CLEAR MAGIC
/SET AC=-1, LINK=1
/SET TALLY TO =1
/GET NUMBER TO BE ROOTED
/SUBTRACT CURRENT MAGIC NUMBER
/OVERFLOW YET
/YES EXIT
/NO INDEX ROOT
/STORE PARTIAL ROOT
/GET MINUS 6
/ADD MAGIC
/STORE BACK IN MAGIC
/GET MAGIC
/MAKE NEW ROOTING NUMBER
/SET LINK
/DO SOME MORE
/WIPE THE WORLD
/GET CUBE ROOT
/EXIT

0226      0000      TEMP, 0
0227      0000      TALLY, 0
0230      0000      MAGIC, 0
0231      0000      ROOT, 0
0232      7772      M6, -6

```

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CBX	0205
CUBROT	0200
FINISH	0223
M6	0232
MAGIC	0230
ROOT	0231
TALLY	0227
TEMP	0226

ERRORS DETECTED: 0

RUN-TIME: 2 SECONDS

4K CORE USED

CUBE ROOT SUBROUTINE

DECUS Program Library Write-up

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This is called with an effective "JMS CUBE" with the argument in the accumulator. The subroutine returns to the memory location following "JMS CUBE" with the result in the accumulator and the remainder in MAGIC:

The following routine will serve to illustrate its calling sequence:

Example:

```
SA 0200
CAL CLL
TAD X
JMS CUBE
HLT           /ANSWER IS IN AC.
```

ALGORITHM

The algorithm makes use of the fact that the third order difference of any stream of consecutive cubes is always equal to six (6).