

VolksForth Math Extension#

for 6502 based systems

```
\ A SINUS-TABLE          20OCT87RE
\   SINUS-TABLE FROM FD Vol IV/1
```

```
| : TABLE      ( VALUES N - )
  CREATE 0 DO , LOOP
  ;CODE      ( N - VALUE )
  SP Ø) LDA  CLC  1 # ADC  .A ASL  TAY
  W )Y LDA  SP X) STA
  INY W )Y LDA  1 # LDY  SP )Y STA
  NEXT JMP  END-CODE
```

```
10000 9998 9994 9986 9976 9962 9945 9925
 9903 9877 9848 9816 9781 9744 9703 9659
 9613 9563 9511 9455 9397 9336 9272 9205
 9135 9063 8988 8910 8829 8746 8660 8572
 8480 8387 8290 8192 8090 7986 7880 7771
 7660 7547 7431 7314 7193 7071 6947 6820
 6691 6561 6428 6293 6157 6018 5878 5736
 5592 5446 5299 5150 5000 4848 4695 4540
 4384 4226 4067 3907 3746 3584 3420 3256
 3090 2924 2756 2588 2419 2250 2079 1908
 1736 1564 1392 1219 1045 0872 0698 0523
 0349 0175 0000
```

```
&91 | TABLE SINTABLE
```

```
| : S180      ( DEG -- SIN*10000:SIN 0-180 )
  DUP &90 >
  IF &180 SWAP - THEN
  SINTABLE ;
```

```
: SIN        ( DEG -- SIN*10000 )
  &360 MOD DUP 0< IF &360 + THEN
  DUP &180 >
  IF &180 - S180 NEGATE
  ELSE S180 THEN ;
```

```
: COS        ( DEG -- COS*10000 )
  &360 MOD &90 + SIN ;
```

```
: TAN        ( DEG -- TAN*10000 )
  DUP SIN SWAP COS ?DUP
  IF &100 SWAP */ ELSE 3 * THEN ;
```

```
CODE D2*     ( D1 - D2 )
  2 # LDA SETUP JSR
  N 2+ ASL N 3 + ROL  N ROL N 1+ ROL
  SP 2DEC N 3 + LDA SP )Y STA
  N 2+ LDA SP X) STA
  SP 2DEC N 1+ LDA SP )Y STA
  N LDA SP X) STA
  NEXT JMP END-CODE
```

```
: DU< &32768 + ROT &32768 + ROT ROT D< ;
```

| : EASY-BITS (N1 -- N2)

0 DO

>R D2* D2* R@ - DUP 0<

IF R@ + R> 2* 1-

ELSE R> 2* 3 +

THEN

LOOP ;

| : 2'S-BIT

>R D2* DUP 0<

IF D2* R@ - R> 1+

ELSE D2* R@ 2DUP U<

IF DROP R> 1- ELSE - R> 1+ THEN

THEN ;

| : 1'S-BIT

>R DUP 0<

IF 2DROP R> 1+

ELSE D2* &32768 R@ DU< 0=

NEGATE 0> +

THEN ;

: SQRT (UD1 - U2)

0 1 8 EASY-BITS

ROT DROP 6 EASY-BITS

2'S-BIT 1'S-BIT ;

\ Test

\

\ : XX

\ &16 * &62500 UM*

\ SQRT 0 <# # # # ASCII . HOLD #S #>

\ TYPE SPACE ;

CODE 100* (N1 - N2)

SP 0) LDA N STA SP)Y LDA N 1+ STA

N ASL N 1+ ROL N ASL N 1+ ROL

N LDA N 2+ STA N 1+ LDA N 3 + STA

N 2+ ASL N 3 + ROL N 2+ ASL N 3 + ROL

N 2+ ASL N 3 + ROL

CLC N LDA N 2+ ADC N STA

N 1+ LDA N 3 + ADC N 1+ STA

N 2+ ASL N 3 + ROL

CLC N LDA N 2+ ADC SP X) STA

N 1+ LDA N 3 + ADC SP)Y STA

NEXT JMP END-CODE

LABEL 4/+

N 7 + LSR N 6 + ROR N 5 + ROR N 4 + ROR

N 7 + LSR N 6 + ROR N 5 + ROR N 4 + ROR

CLC N LDA N 4 + ADC N STA

N 1+ LDA N 5 + ADC N 1+ STA

SP X) LDA N 6 + ADC SP X) STA

SP)Y LDA N 7 + ADC SP)Y STA RTS

CODE 100U/ (U - N)

N STX N 4 + STX

SP X) LDA .A ASL N 1+ STA N 5 + STA

SP)Y LDA .A ROL SP X) STA N 6 + STA

```
TXA .A ROL          SP )Y STA  N 7 + STA
4/+ JSR
N 7 + LSR N 6 + ROR N 5 + ROR N 4 + ROR
4/+ JSR
NEXT JMP END-CODE
```