bc Precision calculator

CONCEPTS

Division truncates to scale digits and scale starts at 0, so 10/3 prints 3. Set scale=N first, or use -l (scale 20).

Input read in ibase
↓ compute
Arbitrary precision scale decides digits
↓ print
Output shown in obase

Set obase before ibase when both change: after ibase=16, the number 10 means sixteen. Use A for ten while ibase is 16.

RUNNING BC

bc
Start interactive calculator

bc -l
Math library and scale 20

echo '*<expr>*' | bc -l
Evaluate an expression from a pipe

bc -e '*<expr>*'
Evaluate an expression argument

bc *<file>*
Run a script file, then read stdin

bc -f *<file>*
Run a file, exit afterwards

bc -q
Skip banner (GNU compatibility)

bc -z
Print leading zero (0.5, not .5)

bc -L
Do not wrap long output lines

PRECISION AND BASES

scale=*<n>*
Digits kept after the decimal point

scale
Show current scale

obase=*<n>*
Output base (2 to max)

ibase=*<n>*
Input base (2 to 36)

PRECISION AND BASES (cont.)

obase=16; *<n>*
Convert decimal to hex

ibase=16; *<HEX>*
Read hex as input (uppercase digits)

last or .
Last printed result

OPERATORS

+ - * / %
Basic arithmetic and remainder

^
Power with integer exponent

sqrt(*<x>*)
Square root

++x x-- x+=1
Increment and compound assignment

== != < <= > >=
Comparisons giving 1 or 0

&& || !
Boolean and, or, not

abs(*<x>*)
Absolute value

length(*<x>*)
Number of significant digits

MATH LIBRARY (-L)

s(*<x>*)
Sine in radians

c(*<x>*)
Cosine in radians

a(*<x>*)
Arctangent in radians

l(*<x>*)
Natural logarithm

e(*<x>*)
e to the power x

4*a(1)
Pi to current scale

pi(*<p>*)
Pi at precision p

t(*<x>*)
Tangent

l(*<x>*)/l(10)
Log base 10 (or l10(x))

MATH LIBRARY (-L) (cont.)

log(*<x>*, *<b>*)
Logarithm in any base

p(*<x>*, *<y>*)
Power with non-integer exponent

r(*<x>*, *<p>*)
Round to p places

root(*<x>*, *<n>*) cbrt(*<x>*)
Nth root; cube root

f(*<n>*)
Factorial

gcd(*<a>*, *<b>*) lcm(*<a>*, *<b>*)
Greatest common divisor; least common multiple

max(*<a>*, *<b>*) min(*<a>*, *<b>*)
Larger or smaller of two

hex(*<x>*) binary(*<x>*)
Print integer as hex or binary

PROGRAMMING

define *<f>*(*<a>*, *<b>*) { ... }
Define a function

define void *<f>*() { ... }
Function that returns no value

auto *<i>*, *<j>*
Local variables (first line in function)

return (*<x>*)
Return a value

if (*<c>*) { } else { }
Conditional

while (*<c>*) { ... }
Loop while true

for (i=0; i<10; i++) { ... }
Counting loop

break continue
Leave or skip a loop iteration

a[*<i>*] = *<x>*
Array element (zero-based)

print "*<text>*", *<x>*, "\n"
Print without implicit newline

"*<text>*"
String literal prints as is

/* ... */ # ...
Comments

quit
Exit bc