

**NAME**

**remainder**, **remainderf**, **remainderl**, **remquo**, **remquof**, **remquol** - minimal residue functions

**LIBRARY**

Math Library (libm, -lm)

**SYNOPSIS**

**#include** <math.h>

*double*

**remainder**(*double x, double y*);

*float*

**remainderf**(*float x, float y*);

*long double*

**remainderl**(*long double x, long double y*);

*double*

**remquo**(*double x, double y, int \*quo*);

*float*

**remquof**(*float x, float y, int \*quo*);

*long double*

**remquol**(*long double x, long double y, int \*quo*);

**DESCRIPTION**

**remainder()**, **remainderf()**, **remainderl()**, **remquo()**, **remquof()**, and **remquol()** return the remainder  $r := x - n*y$  where  $n$  is the integer nearest the exact value of  $x/y$ ; moreover if  $|n - x/y| = 1/2$  then  $n$  is even.

Consequently the remainder is computed exactly and  $|r| \leq |y|/2$ . But attempting to take the remainder when  $y$  is 0 or  $x$  is +-infinity is an invalid operation that produces a NaN.

The **remquo()**, **remquof()**, and **remquol()** functions also store the last  $k$  bits of  $n$  in the location pointed to by *quo*, provided that  $n$  exists. The number of bits  $k$  is platform-specific, but is guaranteed to be at least 3.

**SEE ALSO**

fmod(3), ieee(3), math(3)

## STANDARDS

The **remainder()**, **remainderf()**, **remainderl()**, **remquo()**, **remquof()**, and **remquol()** routines conform to ISO/IEC 9899:1999 ("ISO C99"). The remainder is as defined in IEEE Std 754-1985.

## HISTORY

The **remainder()** and **remainderf()** functions appeared in 4.3BSD and FreeBSD 2.0, respectively. The **remquo()** and **remquof()** functions were added in FreeBSD 6.0, and **remainderl()** and **remquol()** were added in FreeBSD 8.0.