



Linux Ubuntu 26.04 Manual Pages on command 'powl.3'

\$ man powl.3

pow(3) Library Functions Manual pow(3)

NAME

pow, powf, powl - power functions

LIBRARY

Math library (libm, -lm)

SYNOPSIS

```
#include <math.h>

double pow(double x, double y);

float powf(float x, float y);

long double powl(long double x, long double y);
```

Feature Test Macro Requirements for glibc (see feature_test_macros(7)):

```
powf(), powl():

    _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L

    || /* Since glibc 2.19: */ _DEFAULT_SOURCE

    || /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

DESCRIPTION

These functions return the value of x raised to the power of y.

RETURN VALUE

On success, these functions return the value of x to the power of y.

If the result overflows, a range error occurs, and the functions return HUGE_VAL, HUGE_VALF, or HUGE_VALL, respectively, with the mathematically correct sign.

If result underflows, and is not representable, a range error occurs, and 0.0 with the appropriate sign is returned.

If x is $+0$ or -0 , and y is an odd integer less than 0, a pole error occurs and `HUGE_VAL`, `HUGE_VALF`, or `HUGE_VALL`, is returned, with the same sign as x .

If x is $+0$ or -0 , and y is less than 0 and not an odd integer, a pole error occurs and `+HUGE_VAL`, `+HUGE_VALF`, or `+HUGE_VALL`, is returned.

If x is $+0$ (-0), and y is an odd integer greater than 0, the result is $+0$ (-0).

If x is 0, and y greater than 0 and not an odd integer, the result is $+0$.

If x is -1 , and y is positive infinity or negative infinity, the result is 1.0 .

If x is $+1$, the result is 1.0 (even if y is a NaN).

If y is 0, the result is 1.0 (even if x is a NaN).

If x is a finite value less than 0, and y is a finite noninteger, a domain error occurs, and a NaN is returned.

If the absolute value of x is less than 1, and y is negative infinity, the result is positive infinity.

If the absolute value of x is greater than 1, and y is negative infinity, the result is $+0$.

If the absolute value of x is less than 1, and y is positive infinity, the result is $+0$.

If the absolute value of x is greater than 1, and y is positive infinity, the result is positive infinity.

If x is negative infinity, and y is an odd integer less than 0, the result is -0 .

If x is negative infinity, and y less than 0 and not an odd integer, the result is $+0$.

If x is negative infinity, and y is an odd integer greater than 0, the result is negative infinity.

If x is negative infinity, and y greater than 0 and not an odd integer, the result is positive infinity.

If x is positive infinity, and y less than 0, the result is $+0$.

If x is positive infinity, and y greater than 0, the result is positive infinity.

Except as specified above, if x or y is a NaN, the result is a NaN.

ERRORS

See `math_error(7)` for information on how to determine whether an error has occurred when calling these functions.

The following errors can occur:

Domain error: x is negative, and y is a finite noninteger

`errno` is set to `EDOM`. An invalid floating-point exception (`FE_INVALID`) is raised.

Pole error: x is zero, and y is negative

errno is set to ERANGE (but see BUGS). A divide-by-zero floating-point exception (FE_DIVBYZERO) is raised.

Range error: the result overflows

errno is set to ERANGE. An overflow floating-point exception (FE_OVERFLOW) is raised.

Range error: the result underflows

errno is set to ERANGE. An underflow floating-point exception (FE_UNDERFLOW) is raised.

ATTRIBUTES

For an explanation of the terms used in this section, see attributes(7).

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? Interface ? Attribute ? Value ?

??

? pow(), powf(), powl() ? Thread safety ? MT-Safe ?

??

STANDARDS

C11, POSIX.1-2008.

HISTORY

C99, POSIX.1-2001.

The variant returning double also conforms to SVr4, 4.3BSD, C89.

BUGS

Historical bugs (now fixed)

Before glibc 2.28, on some architectures (e.g., x86-64) pow() may be more than 10,000 times slower for some inputs than for other nearby inputs. This affects only pow(), and not powf() nor powl(). This problem was fixed in glibc 2.28.

A number of bugs in the glibc implementation of pow() were fixed in glibc 2.16.

In glibc 2.9 and earlier, when a pole error occurs, errno is set to EDOM instead of the POSIX-mandated ERANGE. Since glibc 2.10, glibc does the right thing.

In glibc 2.3.2 and earlier, when an overflow or underflow error occurs, glibc's pow() generates a bogus invalid floating-point exception (FE_INVALID) in addition to the overflow or underflow exception.

SEE ALSO

cbrt(3), cpow(3), sqrt(3)

