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## ***Red Hat Enterprise Linux Release 9.2 Manual Pages on 'powf.3' command***

### ***\$ man powf.3***

POW(3)                    Linux Programmer's Manual                    POW(3)

#### NAME

pow, powf, powl - power functions

#### 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);
```

Link with -lm.

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 versions <= 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 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 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 is returned.

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

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 +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 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.

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.

## 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)`.

??

?Interface ? Attribute ? Value ?

??

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

??

## CONFORMING TO

C99, POSIX.1-2001, POSIX.1-2008.

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 in?

puts. 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 version 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 version 2.10, glibc does the right thing.

In version 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)`

#### COLOPHON

This page is part of release 5.10 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at <https://www.kernel.org/doc/man-pages/>.

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