## NAME

erf, erff, erfl − error function

## LIBRARY

Math library (*libm*, *−lm*)

## SYNOPSIS

```
#include <math.h>

double erf(double x);
float erff(float x);
long double erfl(long double x);
```

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

**erf**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || _XOPEN_SOURCE
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

**erff**(), **erfl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* glibc <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

## DESCRIPTION

These functions return the error function of *x*, defined as

```
erf(x) = 2/sqrt(pi) * integral from 0 to x of exp(−t*t) dt
```

## RETURN VALUE

On success, these functions return the value of the error function of *x*, a value in the range [−1, 1].

If *x* is a NaN, a NaN is returned.

If *x* is +0 (−0), +0 (−0) is returned.

If *x* is positive infinity (negative infinity), +1 (−1) is returned.

If *x* is subnormal, a range error occurs, and the return value is 2*x/sqrt(pi).

## 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:

Range error: result underflow (*x* is subnormal)
An underflow floating-point exception (**FE_UNDERFLOW**) is raised.

These functions do not set *errno*.

## ATTRIBUTES

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

| Interface | Attribute | Value |
|---|---|---|
| **erf**(), **erff**(), **erfl**() | Thread safety | MT-Safe |

## STANDARDS

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

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

## SEE ALSO

**cerf**(3), **erfc**(3), **exp**(3)