

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

$$\operatorname{erf}(x) = 2/\sqrt{\pi} \cdot \int_0^x \exp(-t^2) dt$$

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 $2x/\sqrt{\pi}$.

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

C11, POSIX.1-2008.

HISTORY

C99, POSIX.1-2001.

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

SEE ALSO

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