

**NAME**

erf, erff, erfl, - error function

**SYNOPSIS**

```
#include <math.h>
```

```
double erf(double x);
```

```
float erff(float x);
```

```
long double erfl(long double x);
```

Link with *-lm*.

Feature Test Macro Requirements for glibc (see [feature\\_test\\_macros\(7\)](#)):

**erf()**:

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE || _ISOC99_SOURCE ||
```

```
_POSIX_C_SOURCE >= 200112L;
```

```
or cc -std=c99
```

**erff()**, **erfl()**:

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE ||
```

```
_POSIX_C_SOURCE >= 200112L;
```

```
or cc -std=c99
```

**DESCRIPTION**

The **erf()** function returns the error function of *x*, defined as

$$\text{erf}(x) = 2/\sqrt{\pi} * \int_0^x \exp(-t^2) dt$$
**RETURN VALUE**

On success, these functions return 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**

**Multithreading (see [pthreads\(7\)](#))**

The **erf()**, **erff()**, and **erfl()** functions are thread-safe.

**CONFORMING TO**

C99, POSIX.1-2001. The variant returning *double* also conforms to SVr4, 4.3BSD.

**SEE ALSO**

[cerf\(3\)](#), [erfc\(3\)](#), [exp\(3\)](#)

**COLOPHON**

This page is part of release 3.74 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 <http://www.kernel.org/doc/man-pages/>.