

**NAME**

acosh, acoshf, acoshl - inverse hyperbolic cosine function

**SYNOPSIS**

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

```
double acosh(double x);
```

```
float acoshf(float x);
```

```
long double acoshl(long double x);
```

Link with *-lm*.

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

**acosh()**:

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 500 ||
_XOPEN_SOURCE && _XOPEN_SOURCE_EXTENDED || _ISOC99_SOURCE ||
_POSIX_C_SOURCE >= 200112L;
or cc -std=c99
```

**acoshf()**, **acoshl()**:

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE ||
_POSIX_C_SOURCE >= 200112L;
or cc -std=c99
```

**DESCRIPTION**

The **acosh()** function calculates the inverse hyperbolic cosine of *x*; that is the value whose hyperbolic cosine is *x*.

**RETURN VALUE**

On success, these functions return the inverse hyperbolic cosine of *x*.

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

If *x* is +1, +0 is returned.

If *x* is positive infinity, positive infinity is returned.

If *x* is less than 1, a domain error occurs, and the functions return 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 less than 1

*errno* is set to **EDOM**. An invalid floating-point exception (**FE\_INVALID**) is raised.

**CONFORMING TO**

C99, POSIX.1-2001. The variant returning *double* also conforms to SVr4, 4.3BSD, C89.

**SEE ALSO**

[asinh\(3\)](#), [atanh\(3\)](#), [cacosh\(3\)](#), [cosh\(3\)](#), [sinh\(3\)](#), [tanh\(3\)](#)

**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/>.