

**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()**:

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || _XOPEN_SOURCE >= 500 /* Since
glibc 2.19: */ _DEFAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE ||
_SVID_SOURCE
```

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

```
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L /* Since glibc 2.19: */ _DE-
FAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

**DESCRIPTION**

These functions calculate 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.

**ATTRIBUTES**

For an explanation of the terms used in this section, see [attributes\(7\)](#).

Interface	Attribute	Value
<b>acosh(), acoshf(), acoshl()</b>	Thread safety	MT-Safe

**CONFORMING TO**

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

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

**SEE ALSO**

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

**COLOPHON**

This page is part of release 4.16 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/>.