

**NAME**

nextafter, nextafterf, nextafterl, nexttoward, nexttowardf, nexttowardl – floating-point number manipulation

**SYNOPSIS**

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

```
double nextafter(double x, double y);
```

```
float nextafterf(float x, float y);
```

```
long double nextafterl(long double x, long double y);
```

```
double nexttoward(double x, long double y);
```

```
float nexttowardf(float x, long double y);
```

```
long double nexttowardl(long double x, long double y);
```

Link with `-lm`.

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

```
nextafter():
```

```
    _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

```
    || _XOPEN_SOURCE >= 500
```

```
    /* Since glibc 2.19: */ _DEFAULT_SOURCE
```

```
    /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

```
nextafterf(), nextafterl():
```

```
    _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

```
    /* Since glibc 2.19: */ _DEFAULT_SOURCE
```

```
    /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
```

```
nexttoward(), nexttowardf(), nexttowardl():
```

```
    _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

**DESCRIPTION**

The **nextafter()**, **nextafterf()**, and **nextafterl()** functions return the next representable floating-point value following *x* in the direction of *y*. If *y* is less than *x*, these functions will return the largest representable number less than *x*.

If *x* equals *y*, the functions return *y*.

The **nexttoward()**, **nexttowardf()**, and **nexttowardl()** functions do the same as the corresponding **nextafter()** functions, except that they have a *long double* second argument.

**RETURN VALUE**

On success, these functions return the next representable floating-point value after *x* in the direction of *y*.

If *x* equals *y*, then *y* (cast to the same type as *x*) is returned.

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

If *x* is finite, and the result would overflow, a range error occurs, and the functions return **HUGE\_VAL**, **HUGE\_VALF**, or **HUGE\_VALL**, respectively, with the correct mathematical sign.

If *x* is not equal to *y*, and the correct function result would be subnormal, zero, or underflow, a range error occurs, and either the correct value (if it can be represented), or 0.0, is returned.

**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 overflow

An overflow floating-point exception (**FE\_OVERFLOW**) is raised.

Range error: result is subnormal or underflows

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
<b>nextafter()</b> , <b>nextafterf()</b> , <b>nextafterl()</b> , <b>nexttoward()</b> , <b>nexttowardf()</b> , <b>nexttowardl()</b>	Thread safety	MT-Safe

## CONFORMING TO

C99, POSIX.1-2001, POSIX.1-2008. This function is defined in IEC 559 (and the appendix with recommended functions in IEEE 754/IEEE 854).

## BUGS

In glibc version 2.5 and earlier, these functions do not raise an underflow floating-point (**FE\_UNDERFLOW**) exception when an underflow occurs.

## SEE ALSO

**nearbyint(3)**

## COLOPHON

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