

**NAME**

frexp, frexpf, frexpl - convert floating-point number to fractional and integral components

**SYNOPSIS**

```
#include <math.h>

double frexp(double x, int *exp);
float frexpf(float x, int *exp);
long double frexpl(long double x, int *exp);
```

Link with *-lm*.

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

```
frexpf(), frexpl():
    _BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE ||
    _POSIX_C_SOURCE >= 200112L;
    or cc -std=c99
```

**DESCRIPTION**

The **frexp()** function is used to split the number *x* into a normalized fraction and an exponent which is stored in *exp*.

**RETURN VALUE**

The **frexp()** function returns the normalized fraction. If the argument *x* is not zero, the normalized fraction is *x* times a power of two, and its absolute value is always in the range 1/2 (inclusive) to 1 (exclusive), that is, [0.5,1).

If *x* is zero, then the normalized fraction is zero and zero is stored in *exp*.

If *x* is a NaN, a NaN is returned, and the value of *\*exp* is unspecified.

If *x* is positive infinity (negative infinity), positive infinity (negative infinity) is returned, and the value of *\*exp* is unspecified.

**ERRORS**

No errors occur.

**ATTRIBUTES**

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

The **frexp()**, **frexpf()**, and **frexpl()** functions are thread-safe.

**CONFORMING TO**

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

**EXAMPLE**

The program below produces results such as the following:

```
$ ./a.out 2560
frexp(2560, &e) = 0.625: 0.625 * 2^12 = 2560
$ ./a.out -4
frexp(-4, &e) = -0.5: -0.5 * 2^3 = -4
```

**Program source**

```
#include <math.h>
#include <float.h>
#include <stdio.h>
#include <stdlib.h>

int
main(int argc, char *argv[])
{
    double x, r;
```

```
int exp;
x = strtod(argv[1], NULL);
r = frexp(x, &exp);

printf(frexp(%g, &e) = %g: %g * %d^%d = %gn,
x, r, r, FLT_RADIX, exp, x);
exit(EXIT_SUCCESS);
}
```

**SEE ALSO**

[ldexp\(3\)](#), [modf\(3\)](#)

**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/>.