

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():
```

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

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

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

DESCRIPTION

These functions are used to split the number x into a normalized fraction and an exponent which is stored in exp .

RETURN VALUE

These functions return 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

For an explanation of the terms used in this section, see `attributes(7)`.

Interface	Attribute	Value
<code>frexp()</code> , <code>frexpf()</code> , <code>frexpl()</code>	Thread safety	MT-Safe

CONFORMING TO

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

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 = %g\n",
           x, r, r, FLT_RADIX, exp, x);
    exit(EXIT_SUCCESS);
}
```

SEE ALSO**ldexp(3), modf(3)****COLOPHON**

This page is part of release 5.02 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/>.