

**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: */ _DE-
FAULT_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
frexp(), frexpf(), frexpl()	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 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/>.