



## ***Red Hat Enterprise Linux Release 9.2 Manual Pages on 'expm1.3' command***

**\$ man expm1.3**

EXPM1(3)                   Linux Programmer's Manual                   EXPM1(3)

### NAME

expm1, expm1f, expm1l - exponential minus 1

### SYNOPSIS

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

```
double expm1(double x);
```

```
float expm1f(float x);
```

```
long double expm1l(long double x);
```

Link with -lm.

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

expm1():

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

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

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

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

expm1f(), expm1l():

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

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

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

### DESCRIPTION

These functions return a value equivalent to

```
exp(x) - 1
```

The result is computed in a way that is accurate even if the value of x

is near zero? a case where  $\exp(x) - 1$  would be inaccurate due to subtraction of two numbers that are nearly equal.

## RETURN VALUE

On success, these functions return  $\exp(x) - 1$ .

If  $x$  is a NaN, a NaN is returned.

If  $x$  is  $+0$  ( $-0$ ),  $+0$  ( $-0$ ) is returned.

If  $x$  is positive infinity, positive infinity is returned.

If  $x$  is negative infinity,  $-1$  is returned.

If the result overflows, a range error occurs, and the functions return `-HUGE_VAL`, `-HUGE_VALF`, or `-HUGE_VALL`, respectively.

## 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, overflow

`errno` is set to `ERANGE` (but see `BUGS`). An overflow floating-point exception (`FE_OVERFLOW`) is raised.

## ATTRIBUTES

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

??

?Interface           ? Attribute   ? Value   ?

??

?`expm1()`, `expm1f()`, `expm1l()` ? Thread safety ? MT-Safe ?

??

## CONFORMING TO

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

## BUGS

Before `glibc 2.17`, on certain architectures (e.g., `x86`, but not `x86_64`) `expm1()` raised a bogus underflow floating-point exception for some large negative  $x$  values (where the function result approaches  $-1$ ),  
Before approximately `glibc` version `2.11`, `expm1()` raised a bogus invalid floating-point exception in addition to the expected overflow excep?

tion, and returned a NaN instead of positive infinity. for some large positive x values,

Before version 2.11, the glibc implementation did not set `errno` to `ERANGE` when a range error occurred.

#### SEE ALSO

`exp(3)`, `log(3)`, `log1p(3)`

#### COLOPHON

This page is part of release 5.10 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/>.

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