



## ***Rocky Enterprise Linux 9.2 Manual Pages on command 'complex.7'***

**C:\>man complex.7**

COMPLEX(7)                      Linux Programmer's Manual                      COMPLEX(7)

### NAME

complex - basics of complex mathematics

### SYNOPSIS

```
#include <complex.h>
```

### DESCRIPTION

Complex numbers are numbers of the form  $z = a+bi$ , where  $a$  and  $b$  are real numbers and  $i = \sqrt{-1}$ , so that  $i^2 = -1$ .

There are other ways to represent that number. The pair  $(a,b)$  of real numbers may be viewed as a point in the plane, given by X- and Y-coordinates. This same point may also be described by giving the pair of real numbers  $(r,\phi)$ , where  $r$  is the distance to the origin  $O$ , and  $\phi$  the angle between the X-axis and the line  $Oz$ .

Now  $z = r \exp(i\phi) = r(\cos(\phi) + i\sin(\phi))$ .

The basic operations are defined on  $z = a+bi$  and  $w = c+di$  as:

addition:  $z+w = (a+c) + (b+d)i$

multiplication:  $z*w = (a*c - b*d) + (a*d + b*c)i$

division:  $z/w = ((a*c + b*d)/(c*c + d*d)) + ((b*c - a*d)/(c*c + d*d))i$

Nearly all math function have a complex counterpart but there are some complex-only functions.

### EXAMPLE

Your C-compiler can work with complex numbers if it supports the C99 standard.

Link with `-lm`. The imaginary unit is represented by `I`.

```

/* check that exp(i * pi) == -1 */
#include <math.h>    /* for atan */
#include <stdio.h>
#include <complex.h>

int
main(void)
{
    double pi = 4 * atan(1.0);

    double complex z = cexp(I * pi);

    printf("%f + %f * i\n", creal(z), cimag(z));
}

```

#### SEE ALSO

[cabs\(3\)](#), [cacos\(3\)](#), [cacosh\(3\)](#), [carg\(3\)](#), [casin\(3\)](#), [casinh\(3\)](#), [catan\(3\)](#), [catanh\(3\)](#),  
[ccos\(3\)](#), [ccosh\(3\)](#), [cerf\(3\)](#), [cexp\(3\)](#), [cexp2\(3\)](#), [cimag\(3\)](#), [clog\(3\)](#), [clog10\(3\)](#),  
[clog2\(3\)](#), [conj\(3\)](#), [cpow\(3\)](#), [cproj\(3\)](#), [creal\(3\)](#), [csin\(3\)](#), [csinh\(3\)](#), [csqrt\(3\)](#),  
[ctan\(3\)](#), [ctanh\(3\)](#)

#### COLOPHON

This page is part of release 5.05 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/>.

2019-03-06

COMPLEX(7)