Section 02: Common functions

Trigonometric functions

sin(a), **cos**(a), **tan**(a). [a is measured in radians, multiply by $\frac{180}{\pi}$ for degrees]

Logarithmic functions

The "natural logarithm", usually written ln(a): **log**(a)
The logarithm to the base 10: **log10**(a)

pi, e, complex numbers

pi

e: the base of the "natural logarithm"

i: $\sqrt{-1}$

```
octave:1> pi
      ans = 3.1416
%
%    e, the base of the ‘‘natural logarithm’’
octave:1>e
      ans = 2.7183
%
%    always use ( ), even when not strictly necessary
octave:2> (e)^(2)
      ans = 7.3891
%
%    square root of a negative number
octave:3> sqrt(-5)
      ans = 0.00000 + 2.23607i
%
%    cube of a complex number
octave:5> (2 -5i)^(3)
      ans = -142 + 65i
```

Displaying the answer

Octave stores values to a very high degree of accuracy. If you want to see the answer to 15 places, use **format long**.

```
octave:3> format long
octave:4> pi
      ans = 3.14159265358979
```

To show your answer in "scientific" ("floating point") notation use:
format short e
or
format long e

To show the answer to 2 decimal places, use:
format bank [money in dollars and cents is shown to 2 decimal places]

```
octave:6> format short e
octave:7> 1/7
      ans = 1.4286e-01
%
octave:8> format long e
octave:9> 1/7
      ans = 1.42857142857143e-01
%
octave:10> format bank
octave:11> 1/7
      ans = 0.14
```

Absolute value, rounding the answer etc.

absolute value: **abs**(a)
round to the nearest integer: **round**(a)
round downwards: **floor**(a) [="greatest integer function"]
round upwards: **ceil**(a)
round towards 0 : **fix**(a)

The following function is not built-in; we will create it in the next section.
decimal part: **decimal**( )

Octave has many more built-in functions, and we will see some of these when we talk about vectors and matrices.

Try these

1. Find $\log_{10}\left(10^{271.6}\right)$.
2. Compute $10^{0.5}$. Compare the answer with the Octave square root command: **sqrt**(10).
3. Evaluate the numbers 2.71 and -2.71, first using the definitions of **abs**, **round**, **floor**, **ceil**, **fix** and **sign** and then by using Octave.