

Function definitions

The syntax for defining functions is

$$\textit{function-name} \ (\ \textit{arg-list} \) = \textit{expr}$$

where *arg-list* is a comma separated list of zero to nine symbols that receive arguments. Unlike symbol definitions, *expr* is not evaluated when *function-name* is defined. Instead, *expr* is evaluated when *function-name* is used in a subsequent computation. The scope of function arguments is the function definition *expr*.

The following example defines a sinc function and evaluates it at $\pi/2$.

```
f(x) = sin(x)/x  
f(pi/2)
```

$$\frac{2}{\pi}$$

After a user function is defined, *expr* can be recalled using the **binding** function.

```
binding(f)
```

$$\frac{\sin(x)}{x}$$

The following example shows how **eval** is used to evaluate function arguments at specific values.

```
h(f,x,a,b) = abs(eval(f,x,a) - eval(f,x,b))  
h(cos(y), y, 0, pi / 3)
```

$$\frac{1}{2}$$

Symbols in function definition *expr* have global scope. To define a local symbol, extend the argument list. In the following example, argument *y* is used as a local symbol. Note that function *L* is called without supplying an argument for the local symbol.

```
L(f,n,y) = eval(exp(y) / n! d(exp(-y) y^n, y, n), y, f)  
L(cos(x),2)
```

$$\frac{1}{2} \cos(x)^2 - 2 \cos(x) + 1$$

Function definitions cannot be nested. In other words, function definition *expr* cannot contain another function definition.