

# MATLAB Reference Sheet

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### IEEE-754

sign (s), mantissa (m), base (b), and exponent (e)

**Formula:**  $(-1)^s * m * (b)^e$

### MATLAB Tid Bits

MATLAB stands for Matrix Laboratory

MATLAB was first written in FORTAN

MATLAB was later rewritten in C

1 and l look similar but are different

1 is not a prime number in MATLAB

### Basic Types

A scalar is a 1x1 array.

A row vector of length n is a 1xn array.

A column vector of length m is an mx1 array.

A matrix of dimensions m rows and n columns is an mxn array.

### Naming Conventions

Case sensitive variable names

Must start with a letter (A-Z,a-z).

Up to 31 letters, digits, and underscores

No special characters besides underscores.

Can not be a reserved keyword.

### Reserved Keywords

'break'  
'case'  
'catch'  
'classdef'  
'continue'  
'else'  
'elseif'  
'end'  
'for'  
'function'  
'global'  
'if'  
'otherwise'  
'parfor'  
'persistent'  
'return'  
'spmd'  
'switch'  
'try'  
'while'

### Special Characters

[] forms matrices  
() used in statements to group operations  
. decimal point  
, separates subscripts or matrix elements  
; separates rows in a matrix definition or suppresses output  
: indicates all rows or all columns  
= assignment operator (not equality)  
% indicates a comment  
%% cell divider  
+ addition  
- subtraction  
\* multiplication  
.\* array multiplication  
/ division  
./ array division  
^ exponential  
.^ array exponential

### Special Variables/Constants

ans default variable for last calculation  
eps 1  
flops count of floating point operations  
Inf infinity  
NaN NaN  
pi the math pi (3.1415)  
i,j  $\sqrt{-1}$   
realmax largest real number MATLAB can represent  
realmin smallest real number MATLAB can represent  
intmax returns largest possible integer used in MATLAB  
intmin returns smallest possible integer used in MATLAB  
clock returns the time  
date returns the date

### Basic Commands and Functions

clc clears command window  
clear clears workspace  
diary creates a copy of all commands and most results  
exit terminates MATLAB  
help invokes help utility  
helpwin invokes windowed help utility  
length length of a vector or maximum dimension of an array  
size display dimensions of a particular array  
quite terminates MATLAB  
save saves variables in a file  
who lists variables in memory  
whos lists variable names, sizes, and types in memory

### Relational and Logical Operators

< less than  
<== less than or equal to  
> greater than  
>== greater than or equal to  
== equal to  
~= not equal to  
& and  
! or  
~ not

### Conditional Statements

```
if expression
    statements
elseif expression
    statements
else
    statements
end

switch switch_expression
    case case_expression
        statements
    case case_expression
        statements
    otherwise
        statements
end
```

### Loops

```
for k = vectorOrColumnList
    statements
end

while logicalExpression
    statements
end
```

### User Defined Functions

normal - function [out1,out2] = func\_name(inp1,inp2)..end  
anonymous - var\_name = @(inp1,inp2) (inp1\*inp2)

### Vector/Matrix Stuff

linspace(a,b,N)	spaced intervals btwn a & b comprised of N pts
zeros(m,n)	an m by n array of zeroes
zeros(n)	an n by n array of zeroes
ones(m,n)	an m by n array of ones
ones(n)	an n by n array of ones
eye(m,n)	an m by n array with ones on the diagonal
eye(n)	an n by n identity matrix
ones(n)	an n by n array of ones
rand(m,n)	an m by n array of random numbers
rand(n)	an n by n array of random numbers
i:k:1	list generation: 1stV alue : Stride : LastV alue
v(1)	1st element of vector v
v(end)	last element of vector v
v(1:2:9)	1st, 3rd, 5th, 7th, 9th elements of vector v
v(2:3:9)	2nd, 5th, 8th elements of vector v
A(2,3)	2nd row, 3rd column of matrix A
A(:,3)	all elements in column 3
A(1,:)	all elements in row 1
A(1:2:end,:)	all odd rows of matrix A
A(1:2,2:4)	sub-matrix of rows 1 and 2, columns 2 through 4
A(1,end)	last element in 1st row

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Based on the works of Winston Chang and Giordano Fusco