MATLAB Onramp Short Documentation

**Basic Syntax**

| **Example** | **Description** |
| --- | --- |
| [x = pi](https://www.mathworks.com/help/matlab/matlab_env/create-and-edit-variables.html) | Create variables and assign values with the equal sign (=).  The left side (x) is the variable name, and the right side (pi) is its value. |
| [y = sin(-5)](https://www.mathworks.com/help/matlab/learn_matlab/calling-functions.html) | Provide inputs to a function using parentheses. |

**Desktop Management**

| **Function** | **Example** | **Description** |  |
| --- | --- | --- | --- |
| [save](https://www.mathworks.com/help/matlab/ref/save.html) | save data.mat | Save your current workspace to a MAT-file. |  |
| [load](https://www.mathworks.com/help/matlab/ref/load.html) | load data.mat | Load the variables in a MAT-file to the workspace. |  |
| [clear](https://www.mathworks.com/help/matlab/ref/clear.html) | clear | Clear all variables from the workspace. |  |
| [clc](https://www.mathworks.com/help/matlab/ref/clc.html) | clc | Clear all text from the Command Window. |  |
| [format](https://www.mathworks.com/help/matlab/ref/format.html) | format long | Change how numeric output appears in the Command Window. |  |

**Array Types**

| **Example** | **Description** |
| --- | --- |
| 4 | scalar |
| [3 5] | row vector |
| [1;3] | column vector |
| [3 4 5; 6 7 8] | matrix |

**Evenly Spaced Vectors**

| **Example** | **Description** |
| --- | --- |
| 1:4 | Create a vector from 1 to 4, spaced by 1, using the [colon operator (:)](https://www.mathworks.com/help/matlab/ref/colon.html). |
| 1:0.5:4 | Create a vector from 1 to 4, spaced by 0.5. |
| [linspace](https://www.mathworks.com/help/matlab/ref/linspace.html)(1,10,5) | Create a vector with 5 elements. The values are evenly spaced from 1 to 10. |

**Matrix Creation**

| **Example** | **Description** |
| --- | --- |
| [rand](https://www.mathworks.com/help/matlab/ref/rand.html)(2) | Create a square matrix with 2 rows and 2 columns. |
| [zeros](https://www.mathworks.com/help/matlab/ref/zeros.html)(2,3) | Create a rectangular matrix with 2 rows and 3 columns of 0s. |
| [ones](https://www.mathworks.com/help/matlab/ref/ones.html)(2,3) | Create a rectangular matrix with 2 rows and 3 columns of 1s. |

**Array Indexing**

| **Example** | **Description** |
| --- | --- |
| A([end](https://www.mathworks.com/help/matlab/ref/end.html),2) | Access the element in the second column of the last row. |
| A(2,:) | Access the entire second row. |
| A(1:3,:) | Access all columns of the first three rows. |
| A(2) = 11 | Change the value of the second element of an array to 11. |

**Array Operations**

| **Example** | **Description** |
| --- | --- |
| [1 2; 3 4] + 1  ans =  2 3  4 5 | Perform [array addition](https://www.mathworks.com/help/matlab/ref/plus.html). |
| [1 1; 1 1]\*[2 2; 2 2]  ans =  4 4  4 4 | Perform [matrix multiplication](https://www.mathworks.com/help/matlab/matlab_prog/array-vs-matrix-operations.html#btyv9yp-4). |
| [1 1; 1 1].\*[2 2; 2 2]  ans =  2 2  2 2 | Perform [element-wise multiplication](https://www.mathworks.com/help/matlab/matlab_prog/array-vs-matrix-operations.html#bu90xxy-1). |

**Multiple Outputs**

| **Example** | **Description** |
| --- | --- |
| [xrow,xcol] = [size](https://www.mathworks.com/help/matlab/ref/size.html)(x) | Save the number of rows and columns in x to two different variables. |
| [xMax,idx] = [max](https://www.mathworks.com/help/matlab/ref/max.html)(x) | Calculate the maximum value of x and its corresponding index value. |

**Documentation**

| **Example** | **Description** |
| --- | --- |
| [doc](https://www.mathworks.com/help/matlab/ref/doc.html) randi | Open the documentation page for the randi function. |

**Plots**

| **Example** | **Description** |
| --- | --- |
| [plot](https://www.mathworks.com/help/matlab/ref/plot.html)(x,y,"ro--",LineWidth=5) | Plot a red (r) dashed (--) line with a  circle (o) marker, with a heavy line width. |
| [hold](https://www.mathworks.com/help/matlab/ref/hold.html) on | Add the next line to the existing plot. |
| hold off | Create new axes for the next plotted line. |
| [title](https://www.mathworks.com/help/matlab/ref/title.html)("My Title") | Add a title to a plot. |
| [xlabel](https://www.mathworks.com/help/matlab/ref/xlabel.html)("x")  [ylabel](https://www.mathworks.com/help/matlab/ref/ylabel.html)("y") | Add labels to axes. |
| [legend](https://www.mathworks.com/help/matlab/ref/legend.html)("a","b","c") | Add a legend to a plot. |

**Tables**

| **Example** | **Description** |
| --- | --- |
| [data.HeightYards](https://www.mathworks.com/help/matlab/matlab_prog/access-data-in-a-table.html) | Extract the variable HeightYards from the table data. |
| data.HeightMeters=data.HeightYards\*0.9144 | Derive a table variable from existing data. |

**Logical Indexing**

| **Example** | **Description** |
| --- | --- |
| [[5 10 15] > 12](https://www.mathworks.com/help/matlab/matlab_prog/array-comparison-with-relational-operators.html) | Compare the elements of a vector to the value 12. |
| [v1(v1 > 6)](https://www.mathworks.com/help/matlab/matlab_prog/find-array-elements-that-meet-a-condition.html) | Extract all elements of v1 that are greater than 6. |
| x(x==999) = 1 | Replace all values in x that are equal to 999 with the value 1. |

**Programming**

| **Example** | **Description** |
| --- | --- |
| [if](https://www.mathworks.com/help/matlab/ref/if.html) x > 0.5  y = 3  else  y = 4  end | If x is greater than 0.5, set y to 3.  Otherwise, set y to 4. |
| [for](https://www.mathworks.com/help/matlab/ref/for.html) c = 1:3  disp(c)  end | The loop counter (c) progresses through the values 1:3 (1, 2, and 3).  The loop body displays each value of c. |