

# Summary of MATLAB Onramp

## Basic syntax

Example	Description
<code>x = pi</code>	Create variables with the equal sign (=). The left-side (x) is the variable name containing the value on the right-side (pi).
<code>y = sin(-5)</code>	You can provide inputs to a function using parentheses.

## Desktop management

Function	Example	Description
<code>save</code>	<code>save data.mat</code>	Save your current workspace to a MAT-file.
<code>load</code>	<code>load data.mat</code>	Load the variables in a MAT-file to the Workspace.
<code>clear</code>	<code>clear</code>	Clear all variables from the Workspace.
<code>clc</code>	<code>clc</code>	Clear all text from the Command Window.
<code>format</code>	<code>format long</code>	Change how numeric output is displayed.

## Array types

Example	Description
<code>4</code>	scalar
<code>[3 5]</code>	row vector
<code>[1;3]</code>	column vector
<code>[3 4 5;6 7 8]</code>	matrix

## Evenly-spaced vectors

Example	Description
<code>1:4</code>	Create a vector from 1 to 4, spaced by 1, using the <a href="#">colon (:)</a> operator.
<code>1:0.5:5</code>	Create a vector from 1 to 5, spaced by 0.5.
<code>linspace(1,10,5)</code>	Create a vector with 5 elements. The values are evenly spaced from 1 to 10.

## Creating matrices

Example	Description
<code>rand(2)</code>	Create a square matrix with 2 rows and 2 columns.
<code>zeros(2,3)</code>	Create a rectangular matrix with 2 rows and 3 columns.

## Indexing

Example	Description
<code>A(<a href="#">end</a>,2)</code>	Access the element in the second column of the last row.
<code>A(2,:)</code>	Access the entire second row
<code>A(1:3,:)</code>	Access all columns of the first three rows.
<code>A(2) = 11</code>	Change the value of the second element an array to 11.

## Array operations

Example	Description
<code>[1 1; 1 1]*[2 2;2 2]</code> <code>ans =</code> 4      4 4      4	Perform <a href="#">matrix multiplication</a> .
<code>[1 1; 1 1].*[2 2;2 2]</code> <code>ans =</code> 2      2 2      2	Perform <a href="#">element-wise multiplication</a> .

## Multiple outputs

Example	Description
<code>[xrow,xcol] = <a href="#">size</a>(x)</code>	Save the number of rows and columns in x to two different variables.
<code>[xMax,idx] = <a href="#">max</a>(x)</code>	Calculate the maximum value of x and its corresponding index value.

## Documentation

Example	Description
<code><a href="#">doc</a> randi</code>	Open the documentation page for the <code>randi</code> function.

## Plotting

Example	Description
<code>plot(x,y,"ro-","LineWidth",5)</code>	Plot a red (r) dashed (--) line with a circle (o) marker, with a heavy line width.
<code>hold on</code>	Add the next line to existing plot.
<code>hold off</code>	Create a new axes for the next plotted line.
<code>title("My Title")</code>	Add a label to a plot.

## Using tables

Example	Description
<code>data.HeightYards</code>	Extract the variable HeightYards from the table data.
<code>data.HeightMeters = data.HeightYards*0.9144</code>	Derive a table variable from existing data.

## Logicals

Example	Description
<code>[5 10 15] &gt; 12</code>	Compare a vector to the value 12.
<code>v1(v1 &gt; 6)</code>	Extract all elements in v1 that are greater than 6.
<code>x(x==999) = 1</code>	Replace all values in x that are equal to 999 with the value 1.

## Programming

Example	Description
<code>if x &gt; 0.5 y = 3 else y = 4 end</code>	If x is greater than 0.5, set the value of y to 3.  Otherwise, set the value of y to 4.
<code>for c = 1:3 disp(c) end</code>	The loop counter (c) progresses through the values 1:3 (1, 2, and 3).  The loop body displays each value of c.