Basic syntax

Create variables with the equal sign (=). The left-side (x) is the variable name containing the value on the right-side (pi).

```
x = pi
```

You can provide inputs to a function using parentheses.

```
y = sin(-5)
```

Desktop management

Save your current workspace to a MAT-file.

```
save data.mat
```

Load the variables in a MAT-file to the Workspace.

```
load data.mat
```

Clear all variables from the Workspace.

```
clear
```

Clear all text from the Command Window.

```
clc
```

Change how numeric output is displayed.

```
format long
x = pi
format short
x = pi
```

Array types

```
4 % scalar
[3 5] % row vector
[1;3] % column vector
[3 4 5;6 7 8] % matrix
```

Evenly-spaced vectors

Create a vector from 1 to 4, spaced by 1, using the colon (:) operator.

```
1:4
```

Create a vector from 1 to 4, spaced by 0.5.

```
1:0.5:5
```

Create a vector with 5 elements. The values are evenly spaced from 1 to 10.

```
linspace(1,10,5)
```

Creating matrices

Create a square matrix with `2` rows and `2` columns.

```
rand(2)
```

Create a rectangular matrix with `2` rows and `3` columns.

```
zeros(2,3)
```

Indexing

```
A = [3 4;5 6;7 8]
```

Access the element in the second column of the last row.

```
A(end,2)
```

Access the entire second row.

```
A(2,:)
```

Access all columns of the first three rows.

```
A(1:3,:)
```

Change the value of the second element an array to `11`.

```
A(2) = 11
```

Array operations

Perform matrix multiplication.

```
[1 1; 1 1]*[2 2;2 2]
```

Perform element-wise multiplication.

```
[1 1; 1 1].*[2 2;2 2]
```

Multiple outputs

Save the number of rows and columns in `x` to two different variables.

```
[xrow,xcol] = size(x)
```

Calculate the maximum value of `x` and its corresponding index value.

```
[xMax,idx] = max(x)
```

Documentation

Open the documentation page for the `randi` function.

```
doc randi
```

Plotting

```
x = rand(5,1);
y = rand(5,1);
z = rand(5,1);
```

Plot a red (r) dashed (--) line with a circle (o) marker, with a heavy line width.

```
plot(x,y,"ro-",LineWidth=5)
```

Add the next line to existing plot.

```
hold on
plot(x,z)
```

Create a new axes for the next plotted line.

```
hold off
plot(x,z)
```

Add a label to a plot.

```
title("My Title")
```

Using tables

```
HeightYards = rand(5,1);
data = table(HeightYards)
```

Extract the variable HeightYards from the table data.

```
data.HeightYards
```

Derive a table variable from existing data.

```
data.HeightMeters = data.HeightYards*0.9144
```

Logicals

Compare a vector to the value 12.

```
[5 10 15] > 12
```

Extract all elements in v1 that are greater than 6.

```
v1 = [5 10 15]
v1(v1 > 6)
```

Replace all values in x that are equal to 999 with the value 1.

```
x = [1 3 999 2]
x(x==999) = 1
```

Programming

```
x = rand(1)
```

If `x` is greater than `0.5`, set the value of `y` to `3`. Otherwise, set the value of `y` to `4`.

```
if x > 0.5
    y = 3
else
    y = 4
end
```

The loop counter (`c`) progresses through the values `1:3` (`1`, `2`, and `3`). The loop body displays each value of `c`.

```
for c = 1:3
    disp(c)
end
```