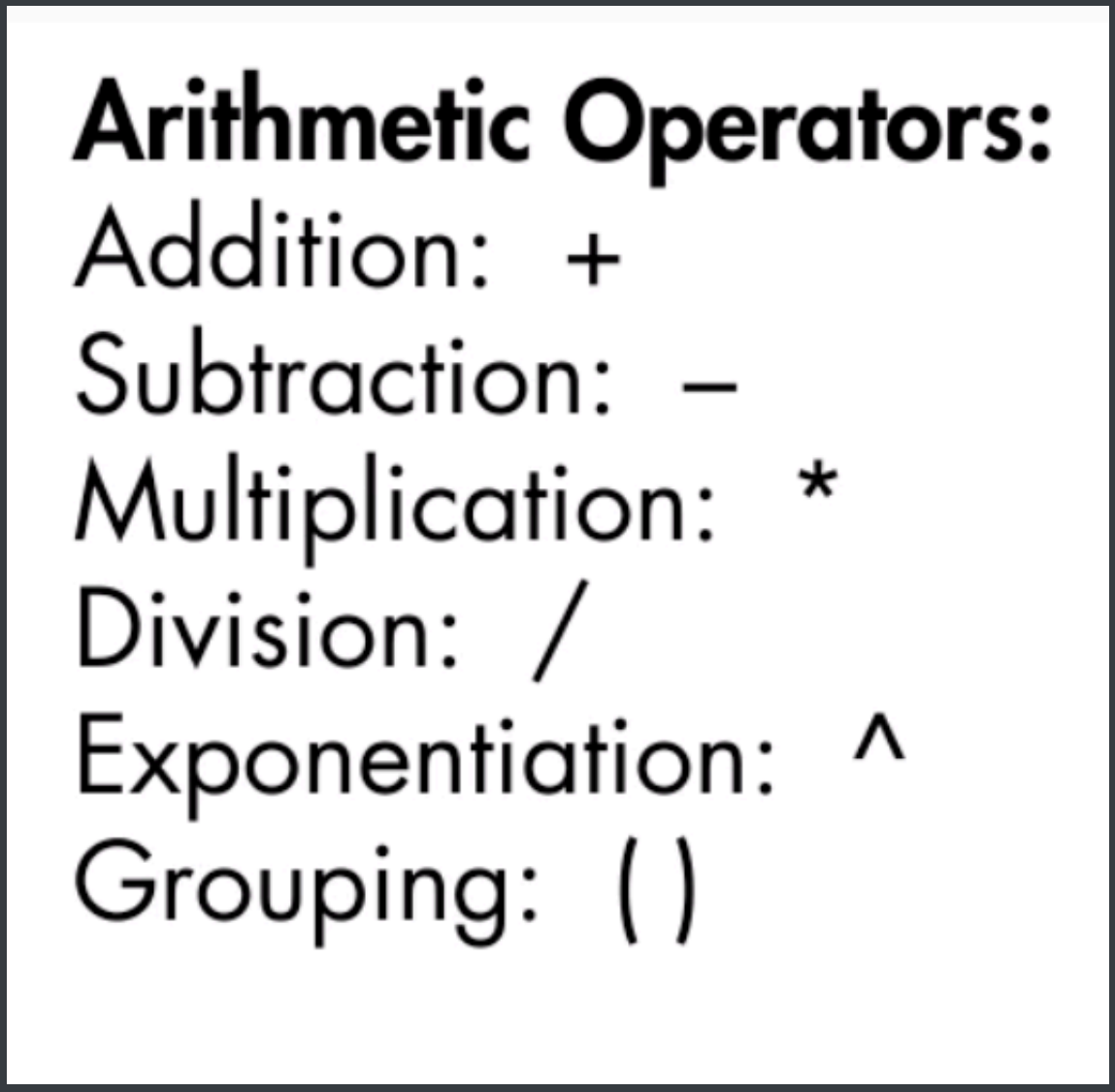
Matlab

"%" represents the comments

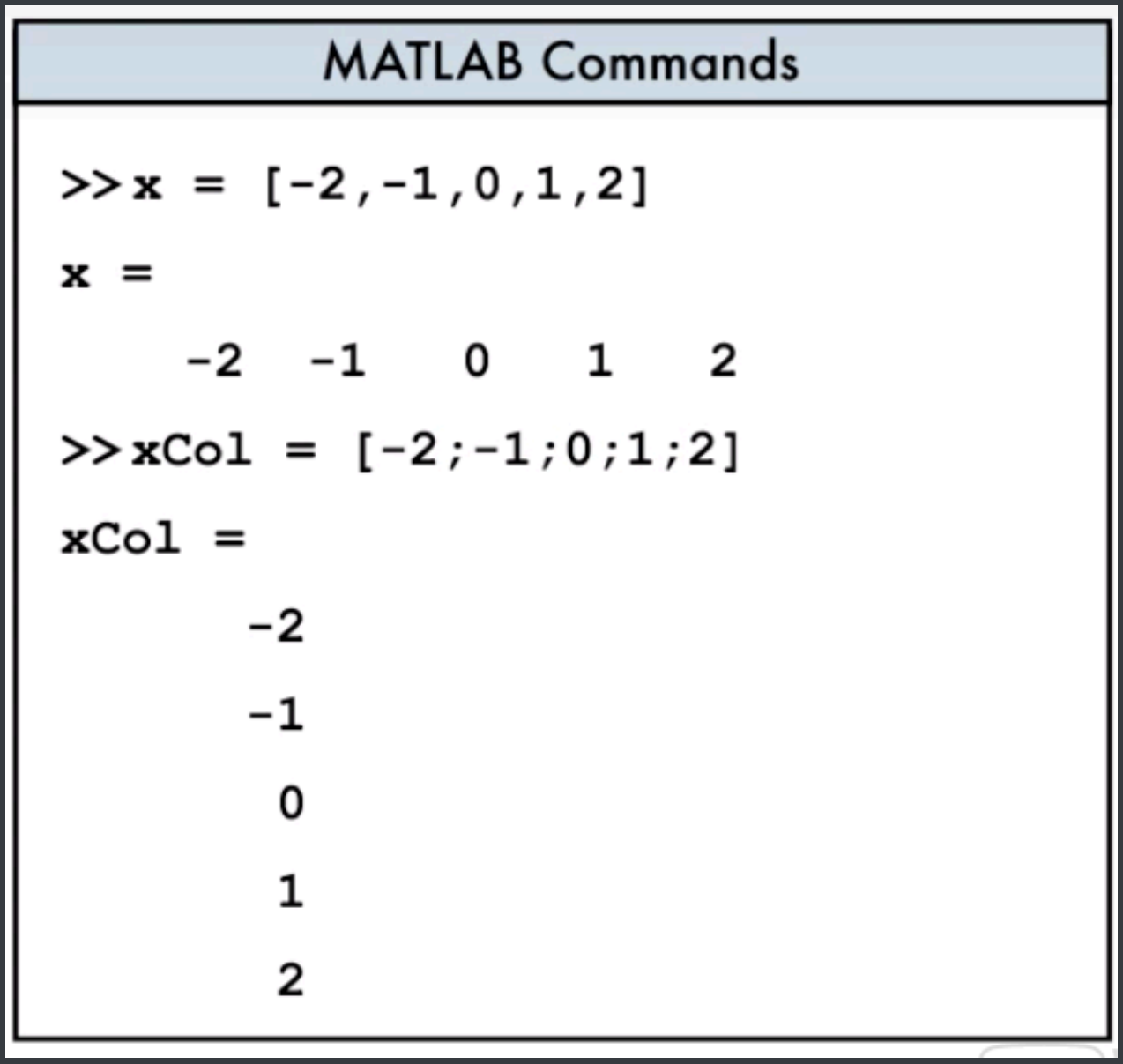
";" prevents output from being displayed



Use plot(x,y)

and array x=[10,3,5,7] y=[5,3,2,4]

to draw a graph(a line made up by points) with the given data

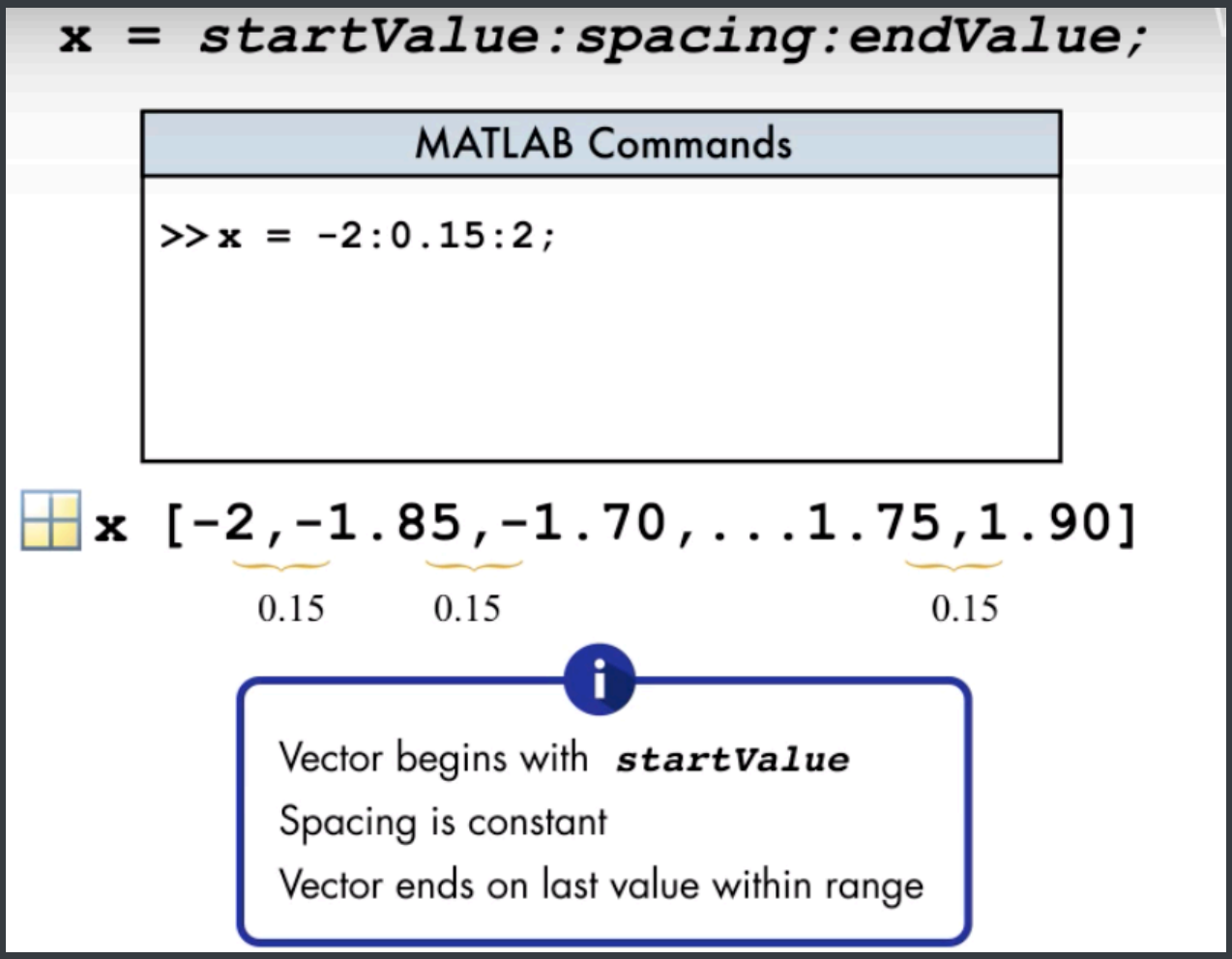


While working on vectors

"," are used to separate row values

";" are used to separate column values

x= startValue:spacing:endValue; — is used to represent a vector start with "startValue" and end with "endValue" spacing is the "spacing"



if spacing is "1" then the middle parameter can be omit

the following pic shows how to represent a column vector

MATLAB Commands

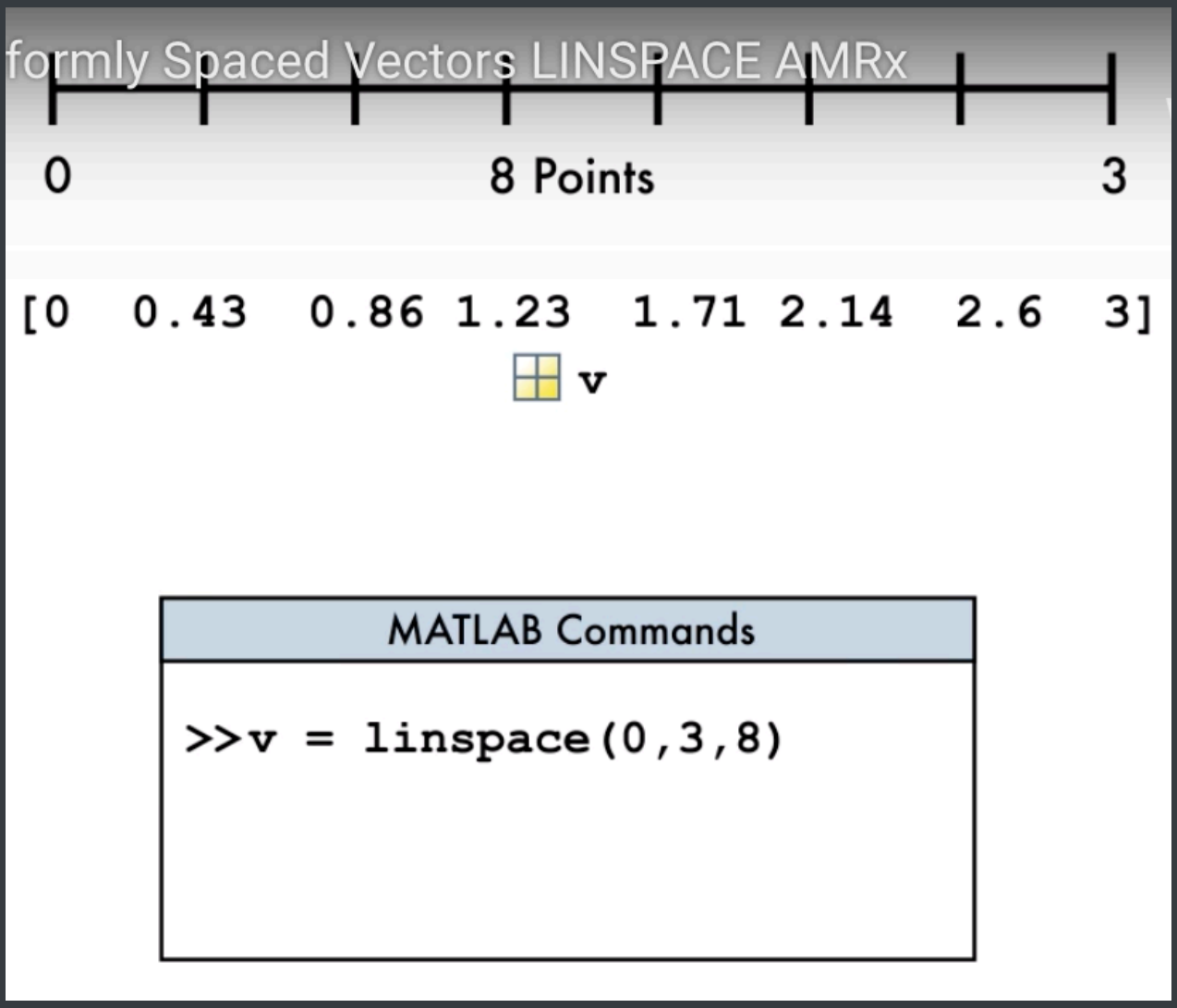
```
>> x = (-2:2)';
```

x

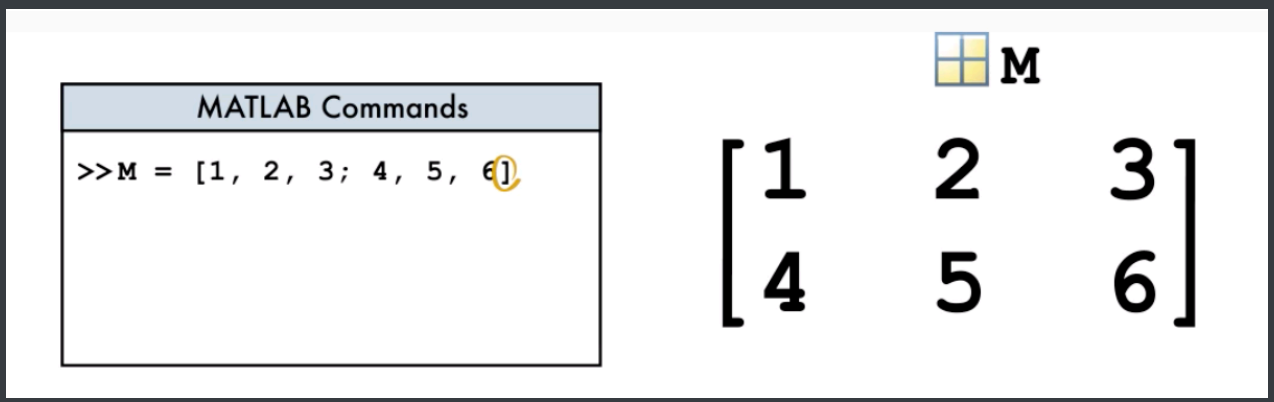
$$\begin{bmatrix} -2 \\ -1 \\ 0 \\ 1 \\ 2 \end{bmatrix}$$

5-by-1 column vector

Function linspace() can be used to get a few sample points from a sequence(range)



Matrices



Using length() function to measure a array while using a size() function to measure a matrices

MATLAB Commands

```
>> n = length(v)
n =
        24
>> [nrows, ncols] = size(A);
```

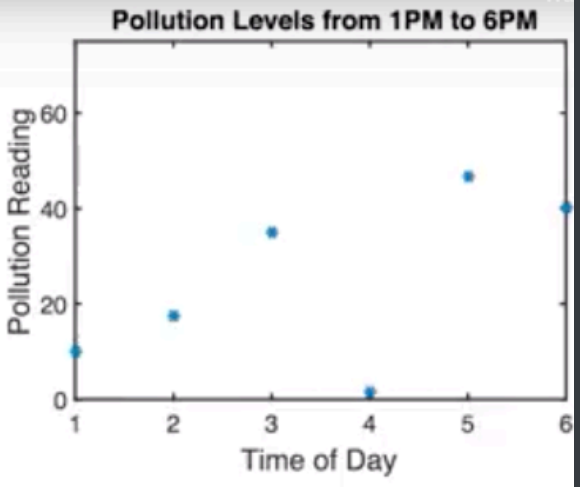
MATLAB Variables

v	<1x24 double>
A	<24x30 double>
nrows	24
ncols	30

Access Elements of a Vector

MATLAB Commands

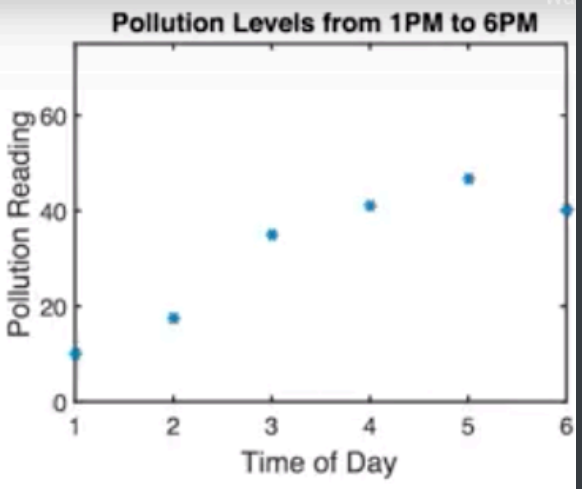
```
>> data(4)
ans =
           0
>> x = data([3 5])
x =
          43   55
>> data(4) = mean(x);
```



data = [18, 25, 43, 0, 55, 48]

MATLAB Commands

```
>> early = 1:3;
>> afternoon = data(early);
>> evening = data(end-2:end);
>> mean(afternoon)
ans =
     28.6667
>> mean(evening)
ans =
     50.6667
```



data = [18, 25, 43, 49, 55, 48]

afternoon = [18, 25, 43]

evening = [49, 55, 48]

Matrices Operations

v1 [1, 2, 3, 4]

v2 [2, 4, 6, 8]

```
v1.*v2 = [1*2, 2*4, 3*6, 4*8]
v1./v2 = [1/2, 2/4, 3/6, 4/8]
v1.^2 = [1^1, 2^2, 3^2, 4^2]

v1+v2 = [1+2, 2+4, 3+6, 4+8]
v1-v2 = [1-2, 2-4, 3-6, 4-8]
```

Element-wise operations

.*

./

.^

Row vector `[2 -1 8.5 6 19]`

`v`

Column vector

$$\begin{bmatrix} 2 \\ -1 \\ 8.5 \\ 6 \\ 19 \end{bmatrix}$$

`c`

MATLAB Commands

```
>> c = v';
```

```
>> rows = [1 5];
>> cols = 2:4;
>> subdata = data(rows,cols);
```

$$\begin{bmatrix} 32 & 26 & 28 \\ 48 & 61 & 69 \end{bmatrix}$$

`subdata`

	1	2	3	4	5
1	18	32	26	28	46
2	25	42	35	30	52
3	43	44	37	52	54
4	49	38	59	54	55
5	55	48	61	69	62
6	48	34	56	42	56

`data`

Using conditions to pick data from a data set (Matrices)

MATLAB Commands

```
>> ind = data > 0.1;
>> activity = data(ind)
```

$$\begin{bmatrix} 0.01 \\ 0.02 \\ 0.01 \\ 0.27 \\ 0.39 \\ 0.01 \\ 0.65 \\ 0.50 \end{bmatrix}$$

`data`

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$$

`ind`

$$\begin{bmatrix} 0.27 \\ 0.39 \\ 0.65 \\ 0.50 \end{bmatrix}$$

`activity`

MATLAB Commands

```
>> A = [5,2,3;1,1,0;2,1,4];
>> x = [-1;2;1];
>> b = A*x;
```

$$\underset{\mathbf{A}}{\begin{bmatrix} 5 & 2 & 3 \\ 1 & 1 & 0 \\ 2 & 1 & 4 \end{bmatrix}} \times \underset{\mathbf{x}}{\begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}} = \underset{\mathbf{b}}{\begin{bmatrix} 2 \\ 1 \\ 4 \end{bmatrix}}$$

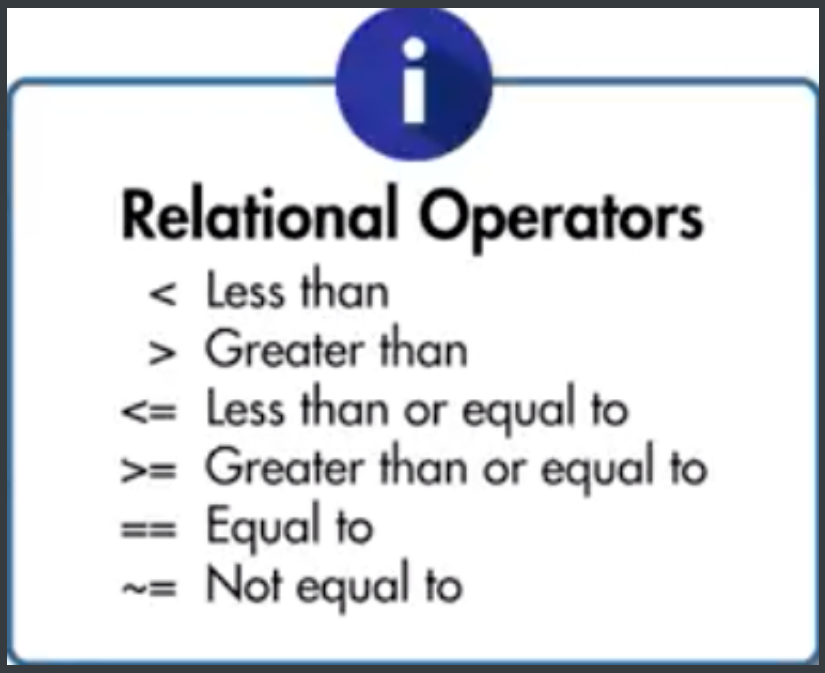
For Loop:

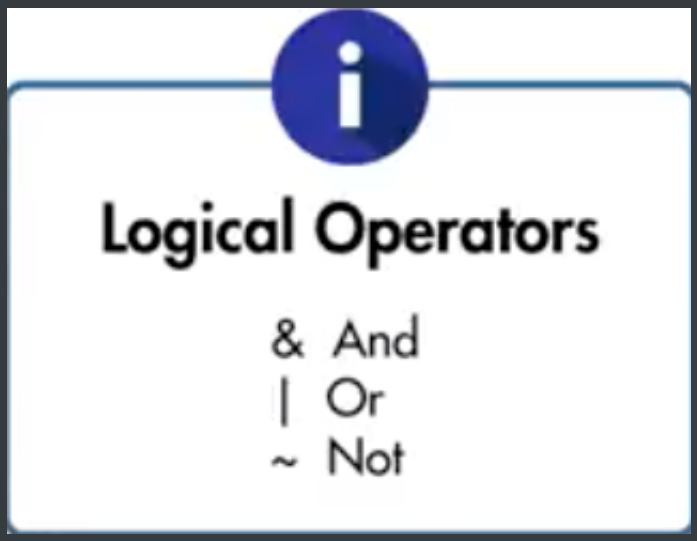
MATLAB Commands

```
r = 0.02;
bal = zeros(1,100);
bal(1) = 20000;
for k = 1:99
  bal(k+1) = (1+r)*bal(k);
end
```

Run

Logical Variables && Operators

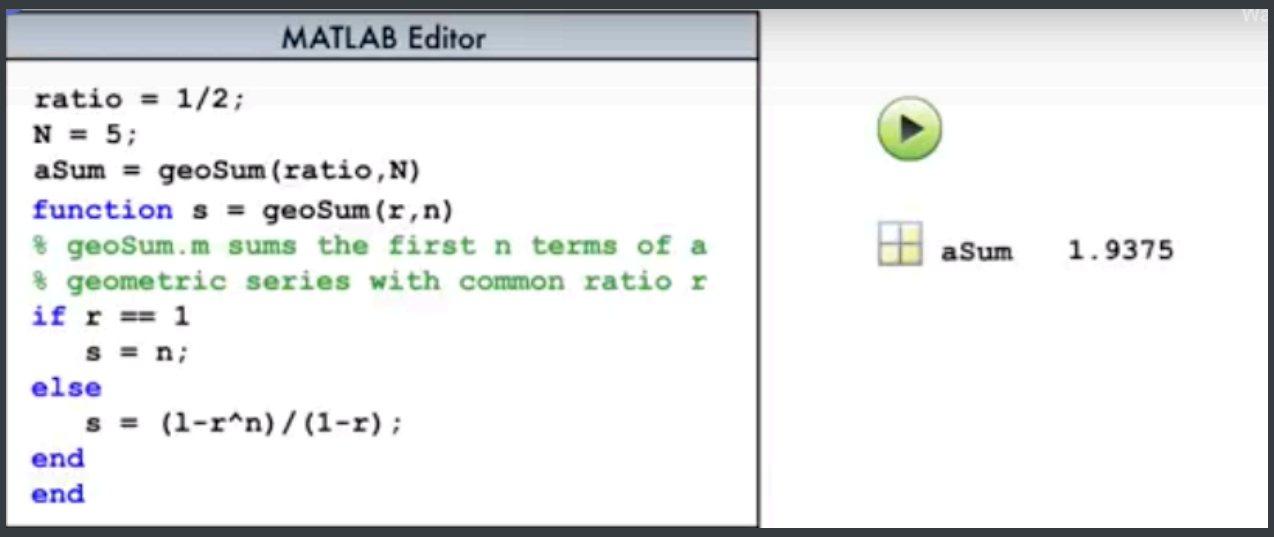


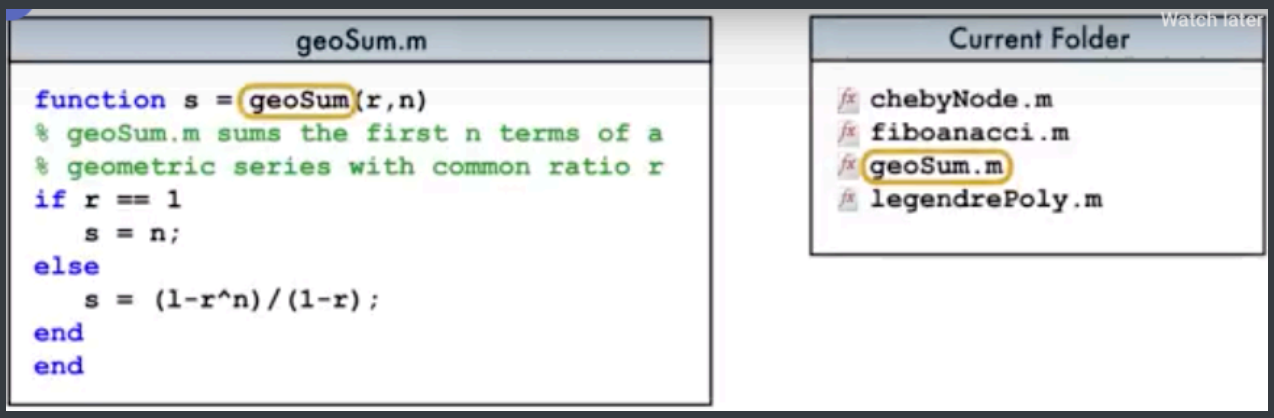


if else statement

```
if hours <= 1
    fee = 0;
elseif hours > 1 & hours < 7
    fee = 35;
else
    fee = 5*(hours-1);
end
```

Custom function





Using " \ " to divided two matrices and use " x = A\B " this to equation "Ax = B"