MATLAB Review

1.16.19

clc - command to clear window
clear - command to clear work space
help sin - command returns help info on specified keyword

trigonometric values

sin(pi/2) = 1
sin(Radians) = ____
sind(decimals) = ____
asin(Radians) = $\sin^{-1}$(Radians)
exp(2) = e^2
Sqrt(5) = $\sqrt{5}$

vectors

must have spaces here.

Row vector: V= [1 2 3 4]
column vector: V= [1; 2; 3; 4]

must have semi colons

increment
first
last

Row vector of specified numbers in a range: [2:3:17]
Column vector of specified numbers in a range: [2:3:17]'

x(1) = First element
x(end) = last element

x=linspace(1,10,6)
→ Creates 6 equally spaced elements between 1 & 10.

example) create a vector that creates 21 equally spaced elements with the last number being 98 and the first number being 2.

z = linspace(2,98,21)

Matrices

M = [1 2 3; 4 5 6]

↑ Rows separated by a semicolon

$$M = \begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{matrix}$$

2nd Row of M: M(2,:)

3rd column of M: M(:,3)

Example) $v = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

Replace the second column of A with v.

```
v = [1;0]
A_new = A
A_new(:,2) = v
```

What is B_new if B_new = [A v]?

$$B\_new = \begin{bmatrix} 1 & 2 & 3 & 1 \\ 4 & 5 & 6 & 0 \end{bmatrix}$$

zero and one vectors/matrices

What is zeros(5)?
5x5 Matrix with all values 0.

What is zeros(2,5)?
2x5 Matrix with all values 0.

What is ones(3)?
3x3 matrix... all 1's

What is ones(2,3)?
2x3 matrix... all 1's

length(M) - max(size(M))
→ Returns the # of rows or columns, whichever is greater

size(M) - # of rows, # of columns

element by element operations

.* - Multiplication
./ - division (right division)
.^ - Exponentiation

plotting

plot() - command that plots a vector of values versus another vector of values
figure - opens a new empty figure window

example)
```
x = linspace(1, 10, 20)
y = x.^2
plot(x, y, '*')
```

What does this return?

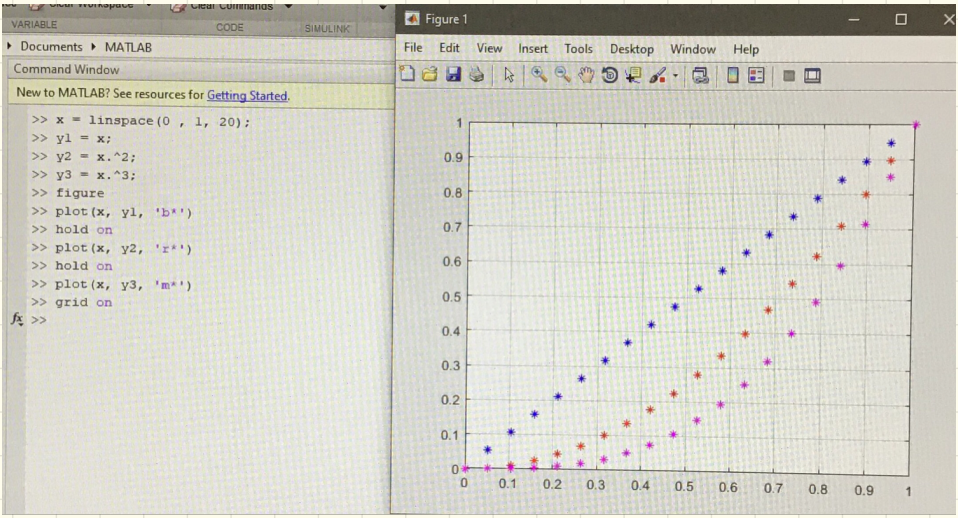
plots the graph $y = x^2$ with * for 20 x values equally spaced between 1 & 10

example) `x = linspace(0,1,20);`

```
y1 = x;
y2 = x.^2;
y3 = x.^3;
```

How do we plot all three in one figure?

```
figure
plot(x, y1, 'b*')   → plots w/ blue *'s
hold on
plot(x, y2, 'r*')   → plots w/ red *'s
hold on
plot(x, y3, 'm*')   plots w/ magenta *'s
grid on             → shows background grid
```



For loop: `For i = First:increment:last`

```
    Statements
end
```