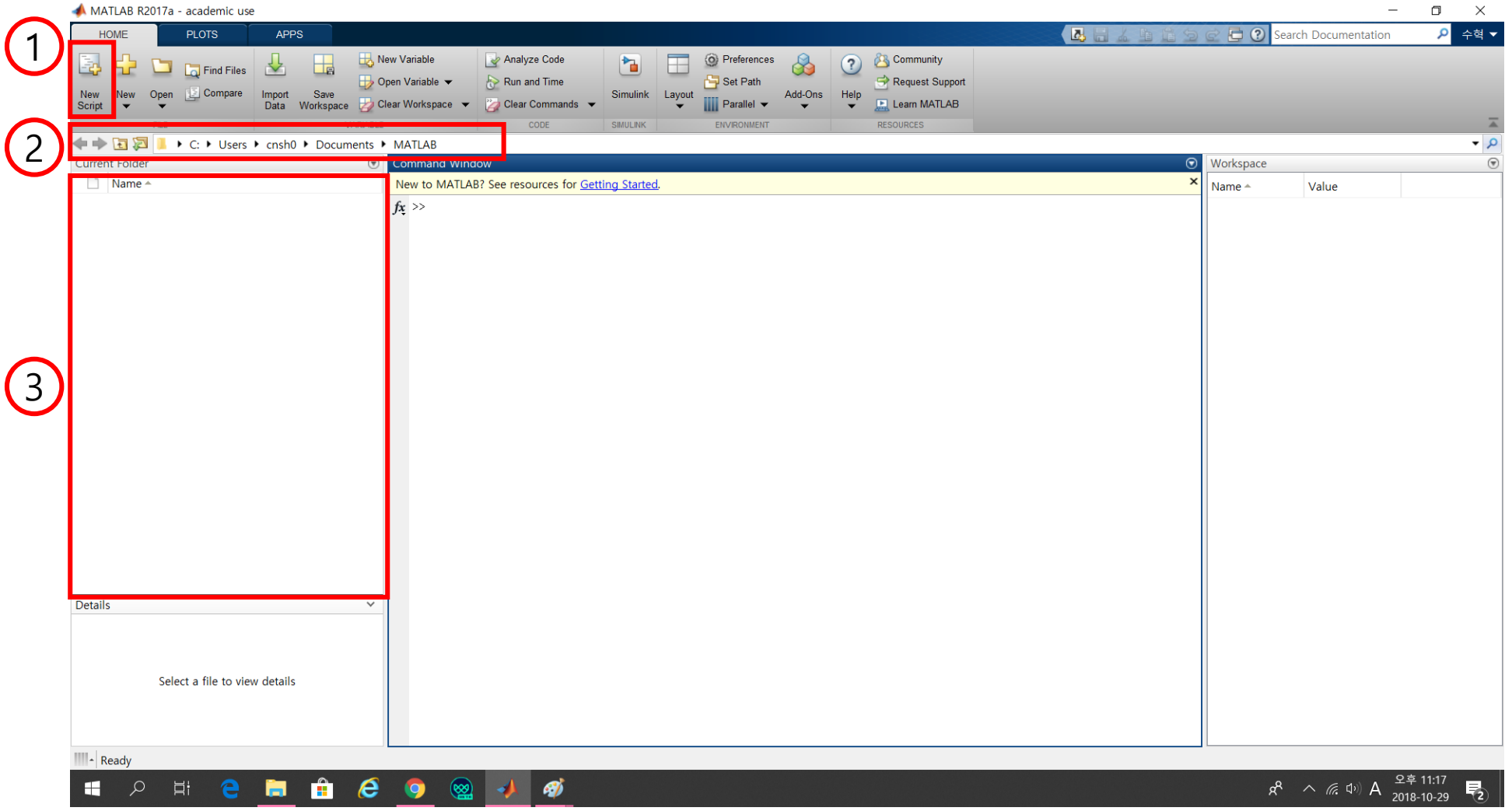
Programming-MATLAB

| Practice class course |

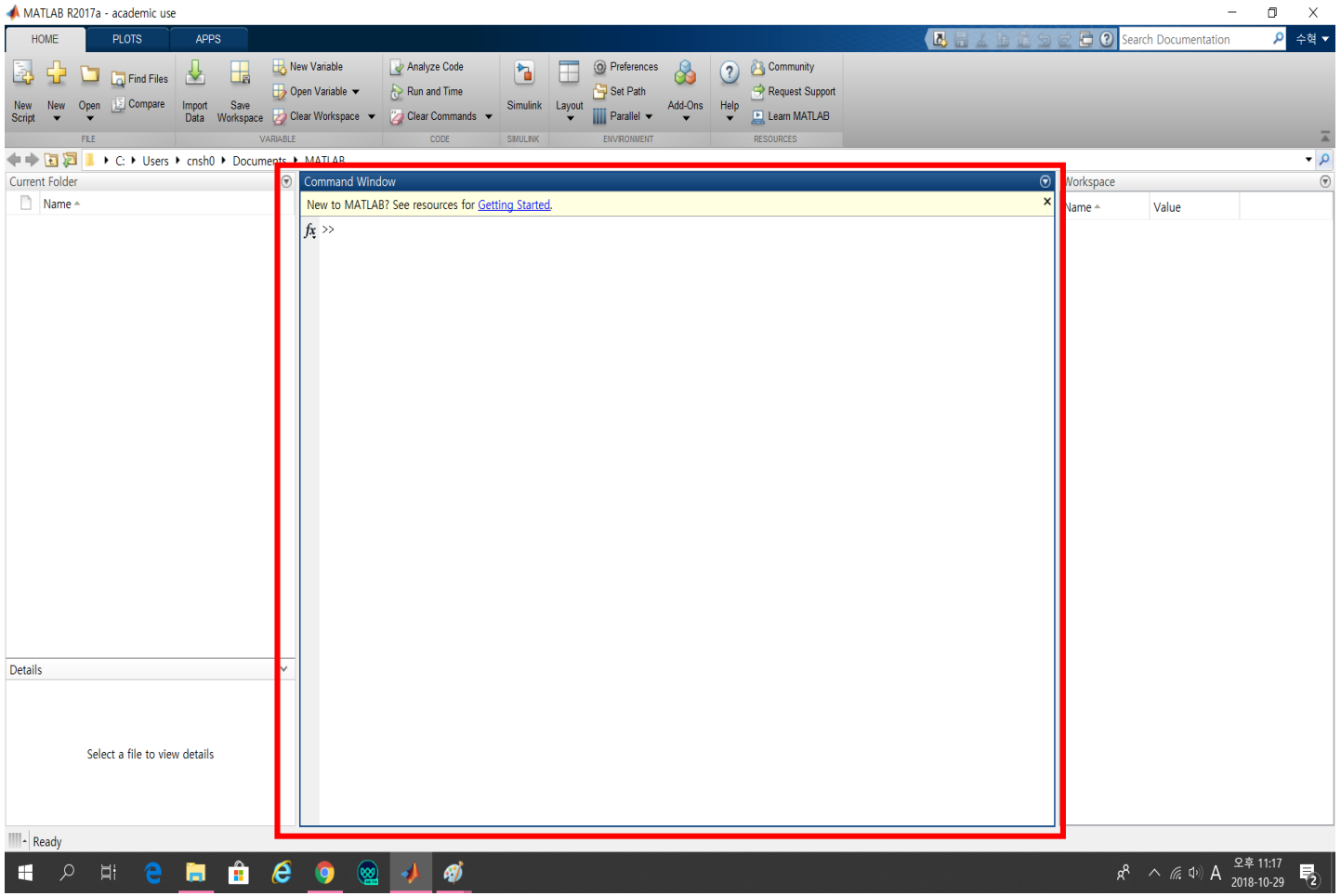
6. Make a class folder

- Create one new folder, and we will store all the files in that folder.



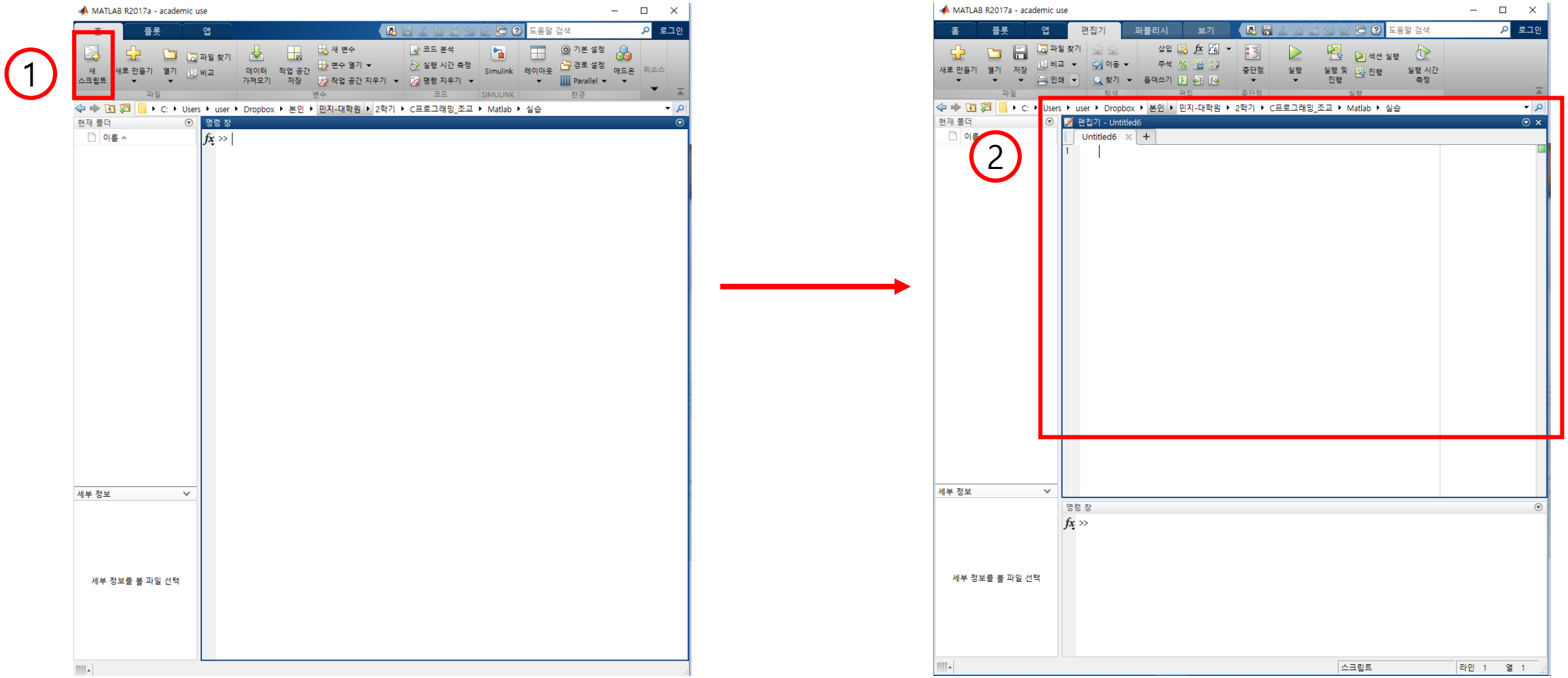
6. Make a new script file

- Command window



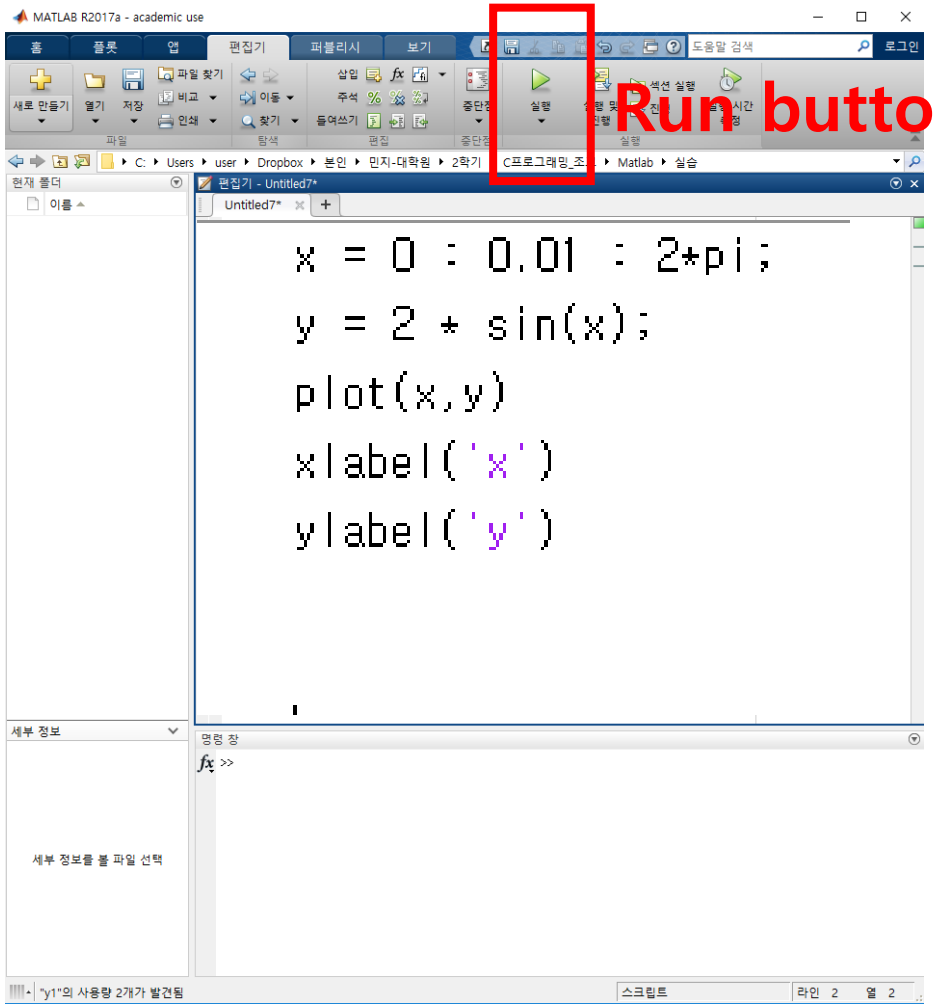
clc : just clears command window
clear : clears your workspace

- Make a new script file



6. Make a new script file

- Make a new script file
  → Matlab dose not require #include <stdio.h>
  → Matlab does not require main function.



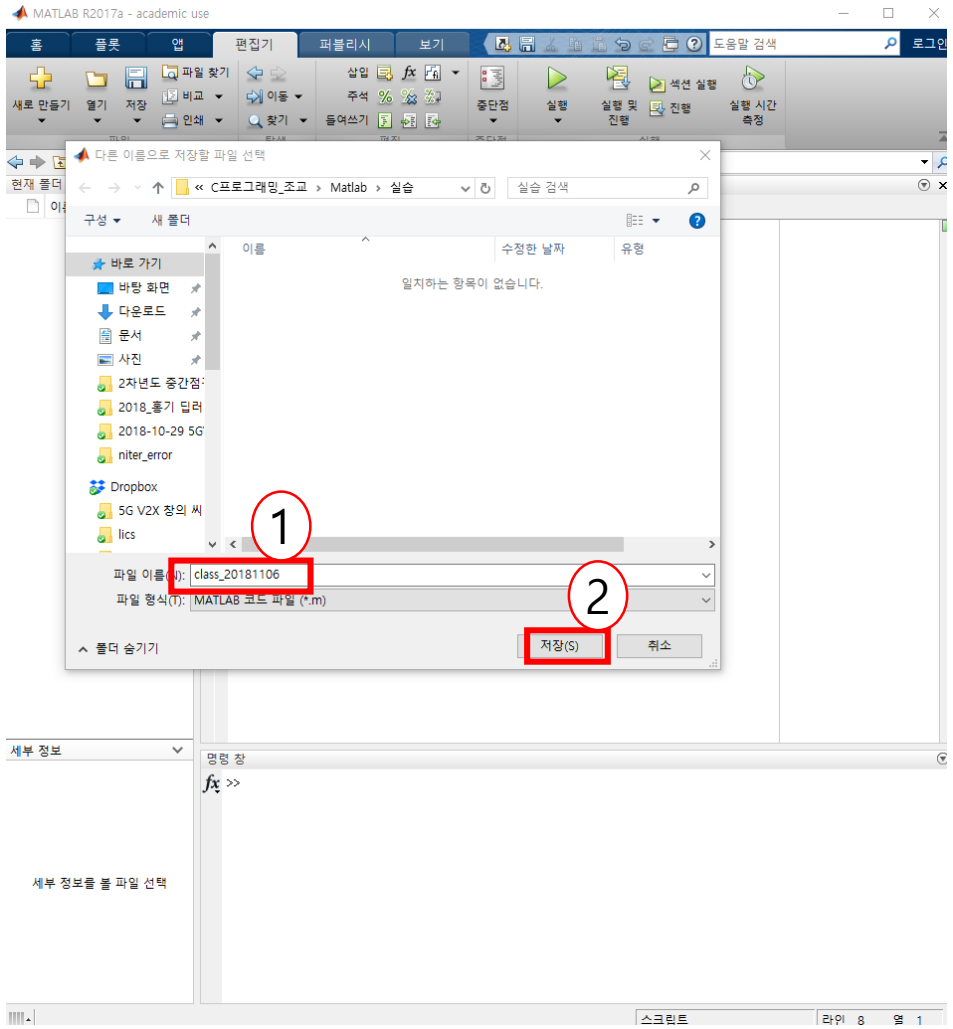
Built-in mathematical functions

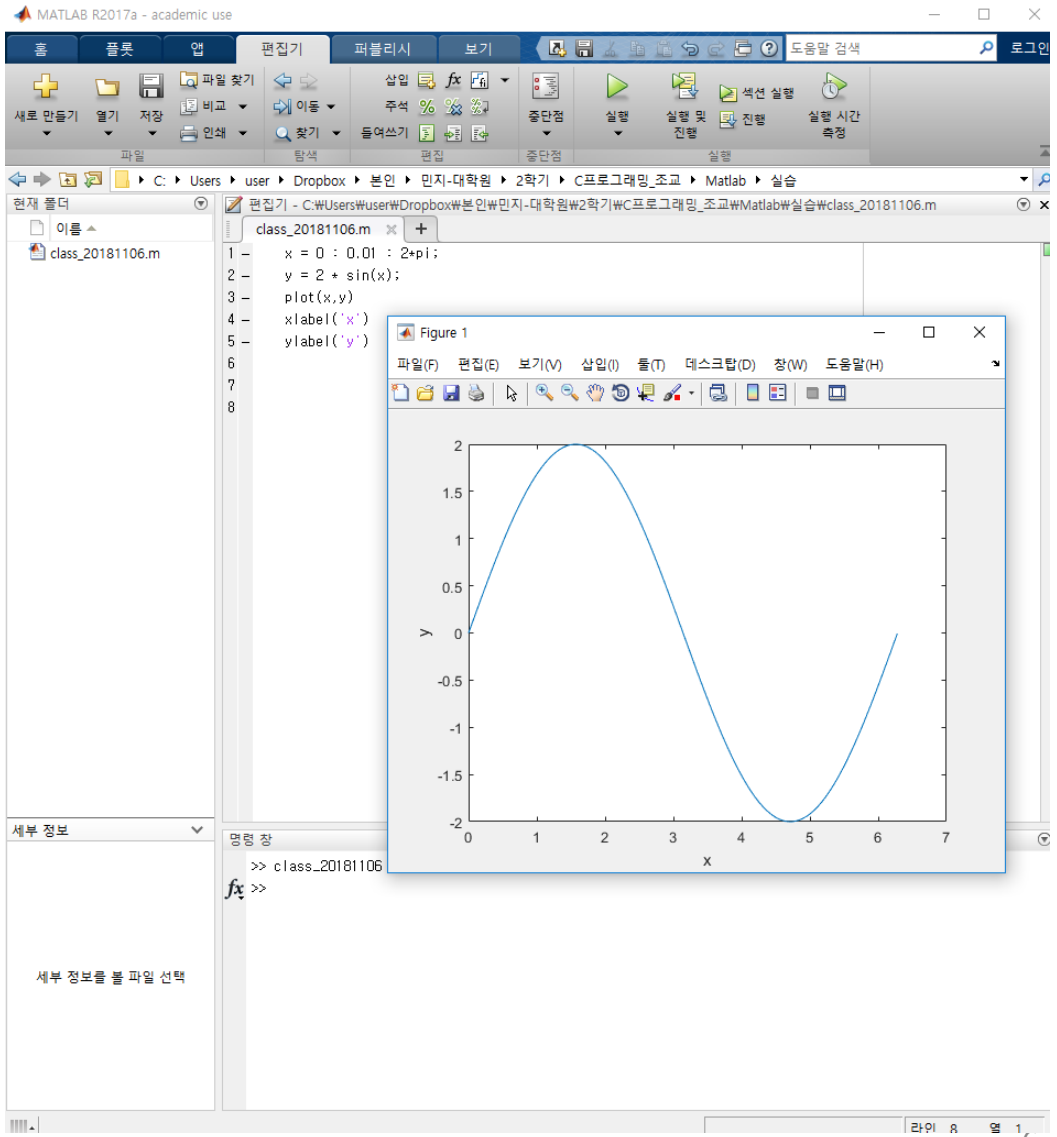
Function	MATLAB syntax[1]
e^x	exp(x)
$\sqrt{x}$	sqrt(x)
$\ln x$	log(x)
$\log_{10} x$	log10(x)
$\cos x$	cos(x)
$\sin x$	sin(x)
$\tan x$	tan(x)
$\cos^{-1} x$	acos(x)
$\sin^{-1} x$	asin(x)
$\tan^{-1} x$	atan(x)

plot(x,y)	Generates a plot of the array y versus the array x on rectilinear axes.
title('text')	Puts text in a title at the top of the plot.
xlabel('text')	Adds a text label to the horizontal axis (the abscissa).
ylabel('text')	Adds a text label to the vertical axis (the ordinate).

6. Using a "plot" command

1. Save the script

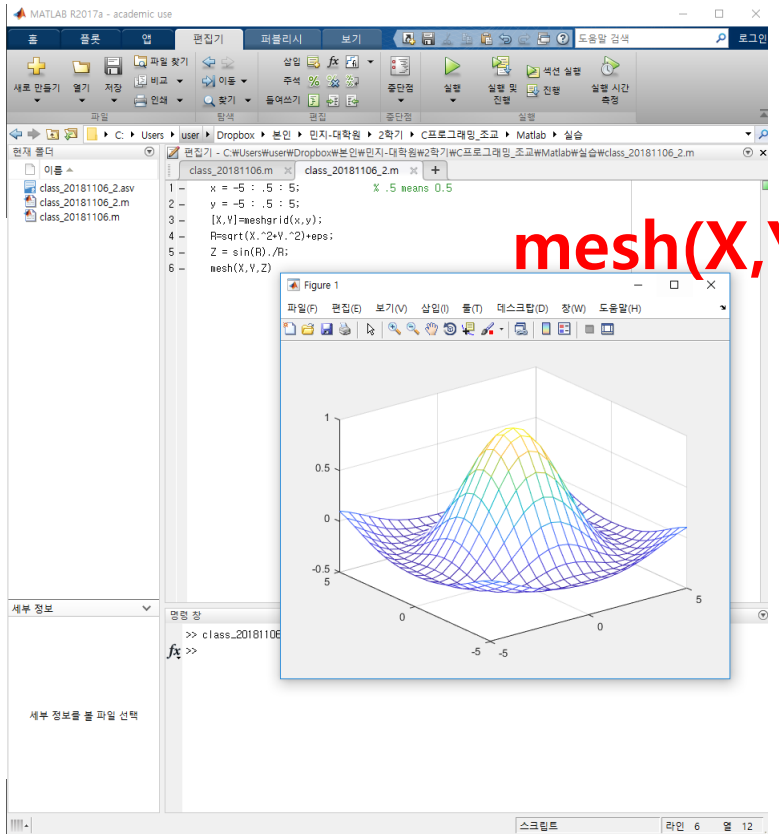


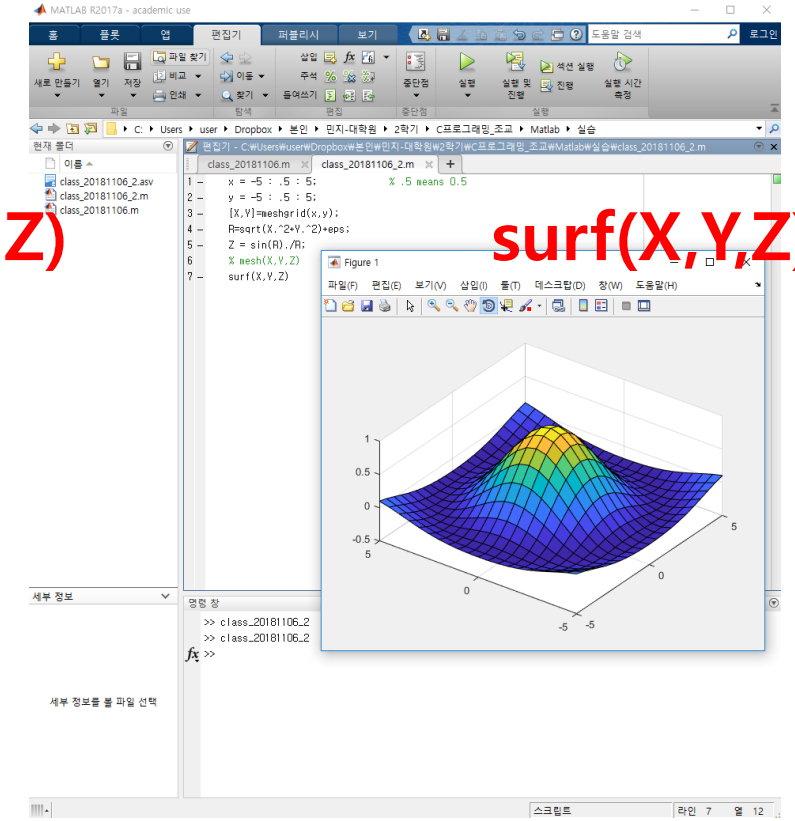


1. Make a new script file

code

```
1 -     x = -5 : .5 : 5;
2 -     y = -5 : .5 : 5;
3 -     [X,Y]=meshgrid(x,y);
4 -     R=sqrt(X.^2+Y.^2)+eps;
5 -     Z = sin(R)./R;
6       % mesh(X,Y,Z)
7 -     surf(X,Y,Z)
```





- **Polyval** / poly / roots

Polynomial equation

$$p(x) = x^2 - 4x + 4$$

1

$$p(x) = 4x^5 - 3x^2 + 2x + 33$$

Matlab code

```
p = [1 -4 4];
```

```
p = [4 0 0 -3 2 33];
```

If you want to find the value of Equation1 when x=2,

명령 창

```
>> p=[4 0 0 -3 2 33];
>> polyval(p,2)

ans =

   153
```

- Polyval / **poly** / **roots**

When you want to create an equation with specific roots, use **"poly"**

```
>> c=poly([-2 -5 -3])

c =

     1     10     31     30

>> d=poly([-2,-5])

d =

     1      7     10
```

When you want to get root when an equation is given, use **"roots"**

```
>> r = roots([2 14 20])

r =

    -5
    -2
```

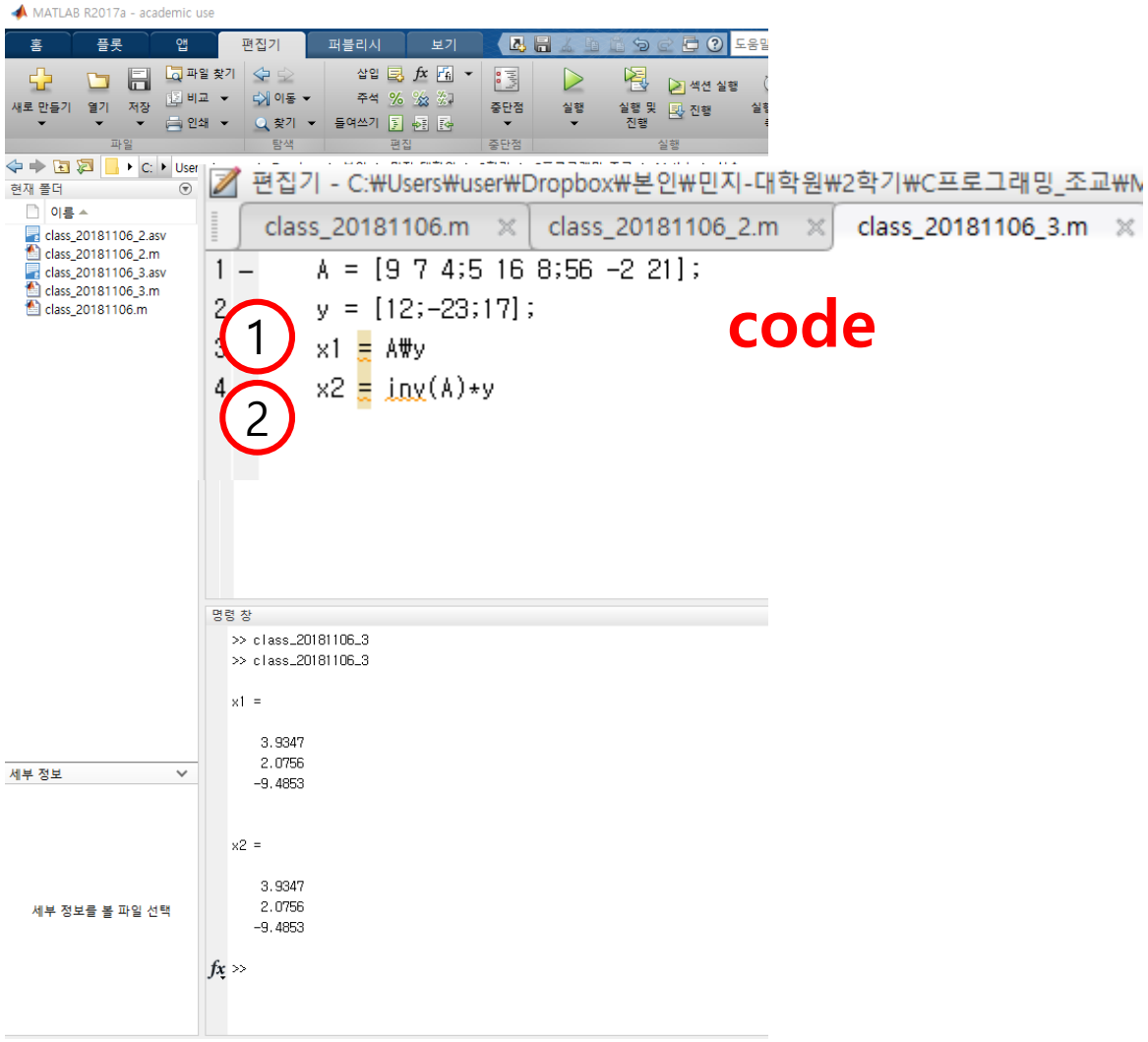
- Linear Algebraic Equations

1. Make a new script file
2. The equations are

$$9x+7y+4z=12$$
$$5x+16y+8z=-23$$
$$56x-2y+21z=17$$

3. The above equation can be expressed in the form of a matrix as follows

$$A=\begin{bmatrix}9 & 7 & 4\\ 5 & 16 & 8\\ 56 & -2 & 21\end{bmatrix},\quad Y=\begin{bmatrix}12\\ -23\\ 17\end{bmatrix}$$



- Consider the following arrays

First column

$$\mathbf{A} = \begin{bmatrix} 1 & 4 & 2 \\ 2 & 4 & 100 \\ 7 & 9 & 7 \\ 3 & \pi & 42 \end{bmatrix}$$

First row

$$\mathbf{B} = \ln(\mathbf{A})$$

- `A(:,3)` denotes all the elements in the third *column* of the matrix A.
- `A(3,:)` denotes all the elements in the third *row* of A.
- `A(:,2:5)` denotes all the elements in the second through fth columns of A.
- `A(2:3,1:3)` denotes all the elements in the second and third rows that are also in the rst through third columns.
- `v = A(:)` creates a vector v consisting of all the columns of A stacked from rst to last.
- `A(end,:)` denotes the last row in A, and `A(:,end)` denotes the last column.

- max(A) returns the largest element in A if A is a vector
- Size(A returns a row vector[m n] containing the sizes of the m x n array A.
- sum(A) sums the elements in each column of the array A and returns a row vector containing the sums

a) Select just the second row of B
b) Evaluate the sum of the second row of B
c) Multiply the second column of B and the first column of A element by element
d) Evaluate the maximum value in the vector resulting from element-by-element multiplication of the second column of B with the first column of A.