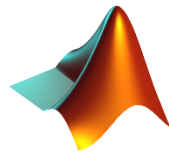


MAT 1011

MATLAB



Digital Assignment – 2

L31+L32

FALL SEMESTER 2019–20

by

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19BCE2105

Question 1

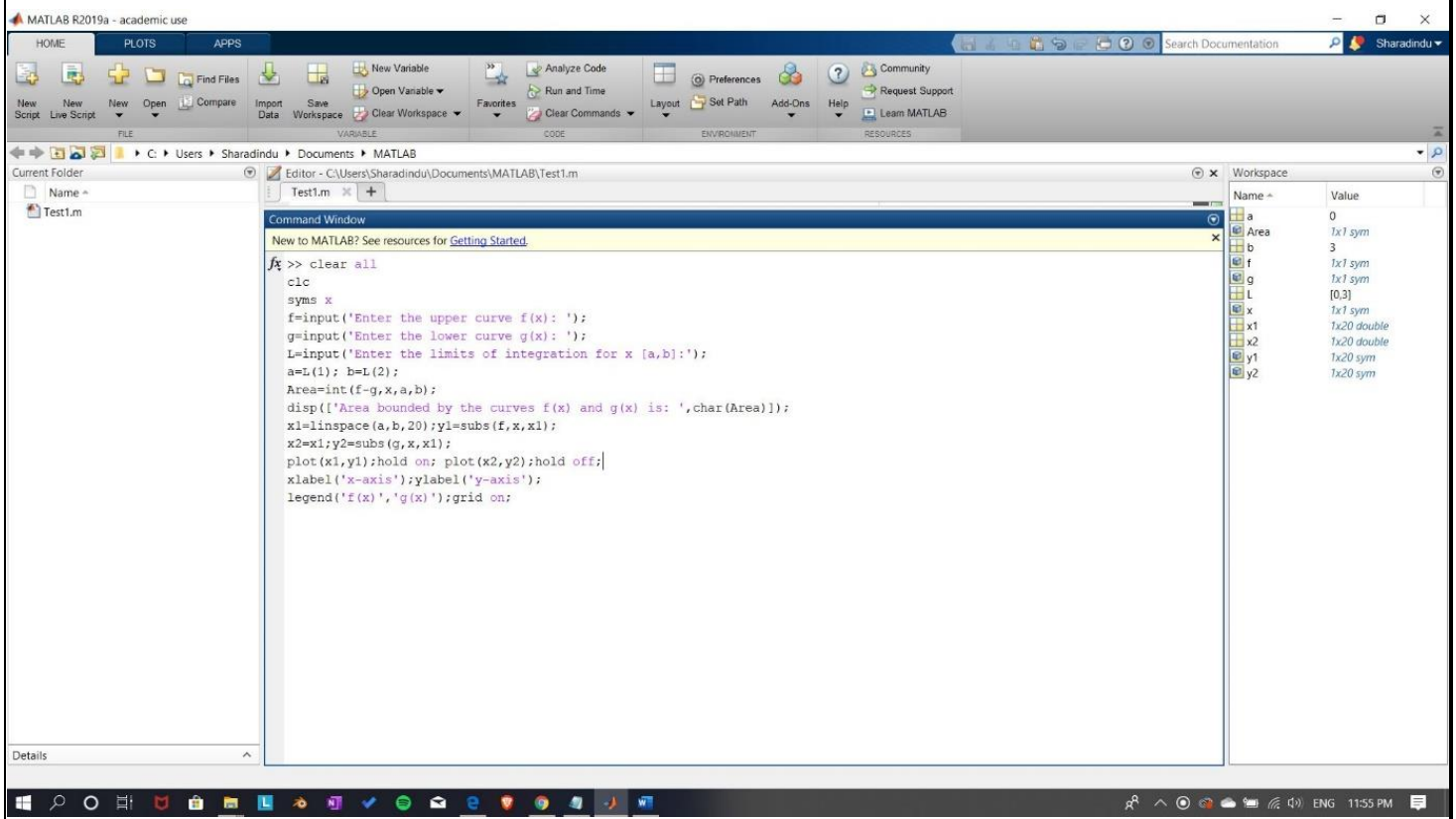
Problem:

Find the area of the region bounded by the curve $y = x^2 - 2x$ and the line $y = x$.

Code in MATLAB:

```
clear all;
clc;
syms x;
f=input('Enter the upper curve f(x): ');
g=input('Enter the lower curve g(x): ');
L=input('Enter the limits of integration for x [a,b]:');
a=L(1); b=L(2);
Area=int(f-g,x,a,b);
disp(['Area bounded by the curves f(x) and g(x) is: ',char(Area)]);
x1=linspace(a,b,20);y1=subs(f,x,x1);
x2=x1;y2=subs(g,x,x1);
plot(x1,y1);hold on; plot(x2,y2);hold off;
xlabel('x-axis');ylabel('y-axis');
legend('f(x)','g(x)');
grid on;
```

Screenshot of Code:



Input:

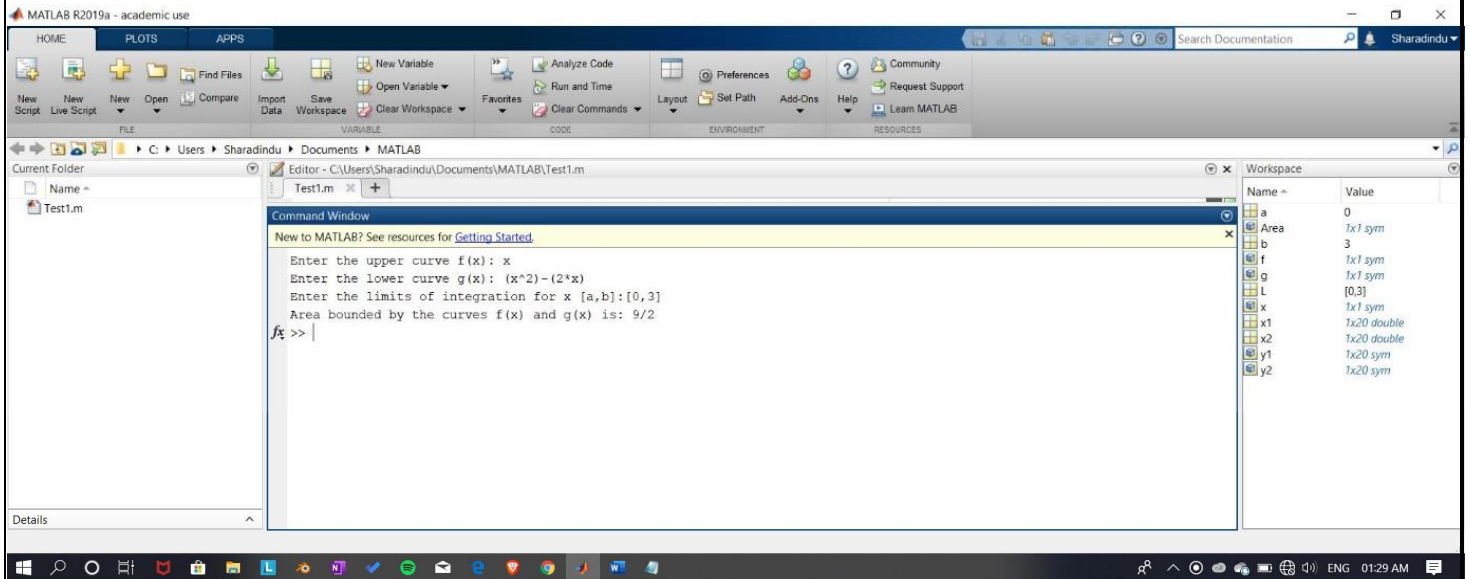
Enter the upper curve $f(x)$: x

Enter the lower curve $g(x)$: $(x^2)-(2*x)$

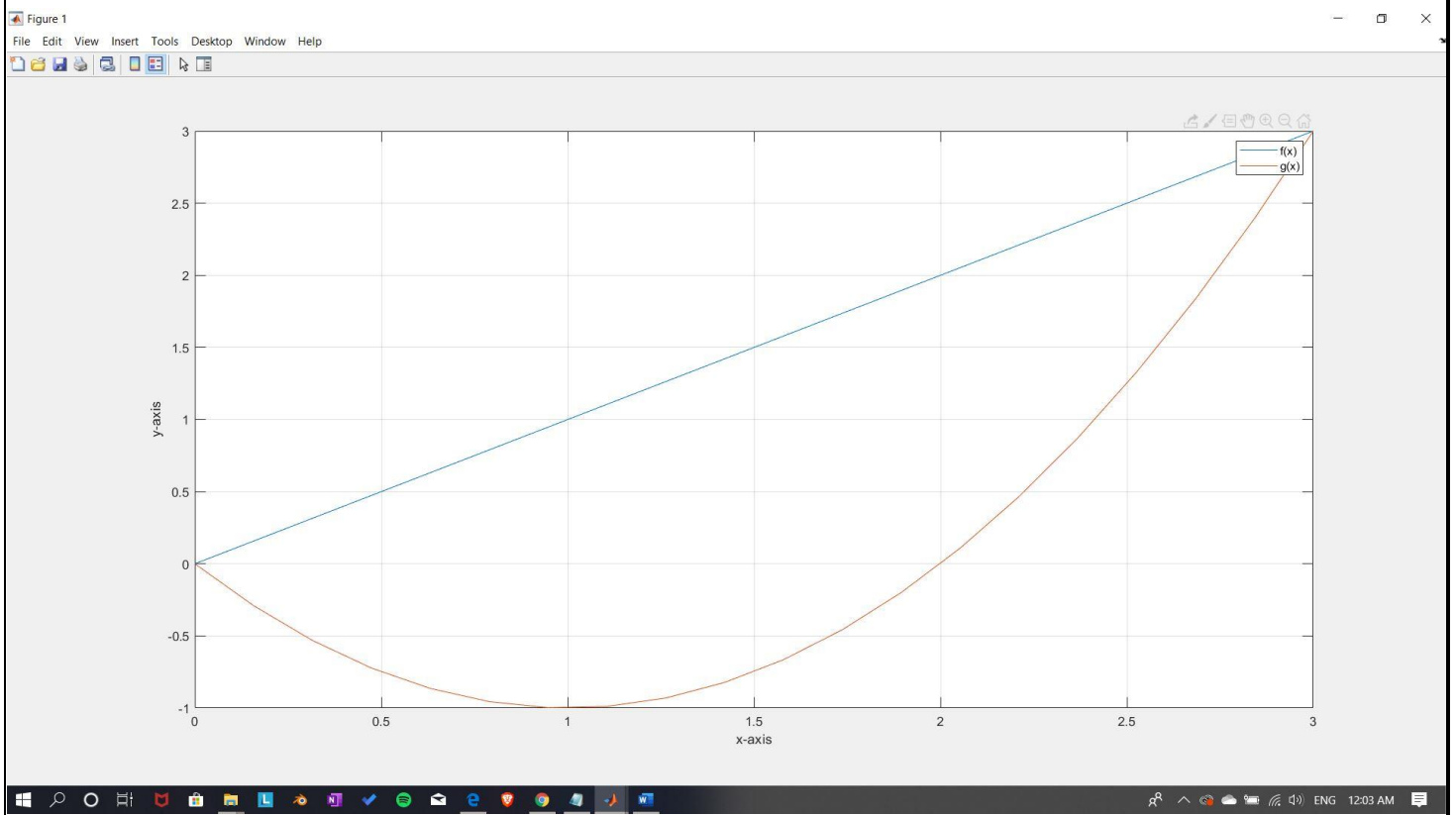
Enter the limits of integration for x $[a,b]:[0,3]$

Output:

Area bounded by the curves $f(x)$ and $g(x)$ is: $9/2$



Graph:



Question 2

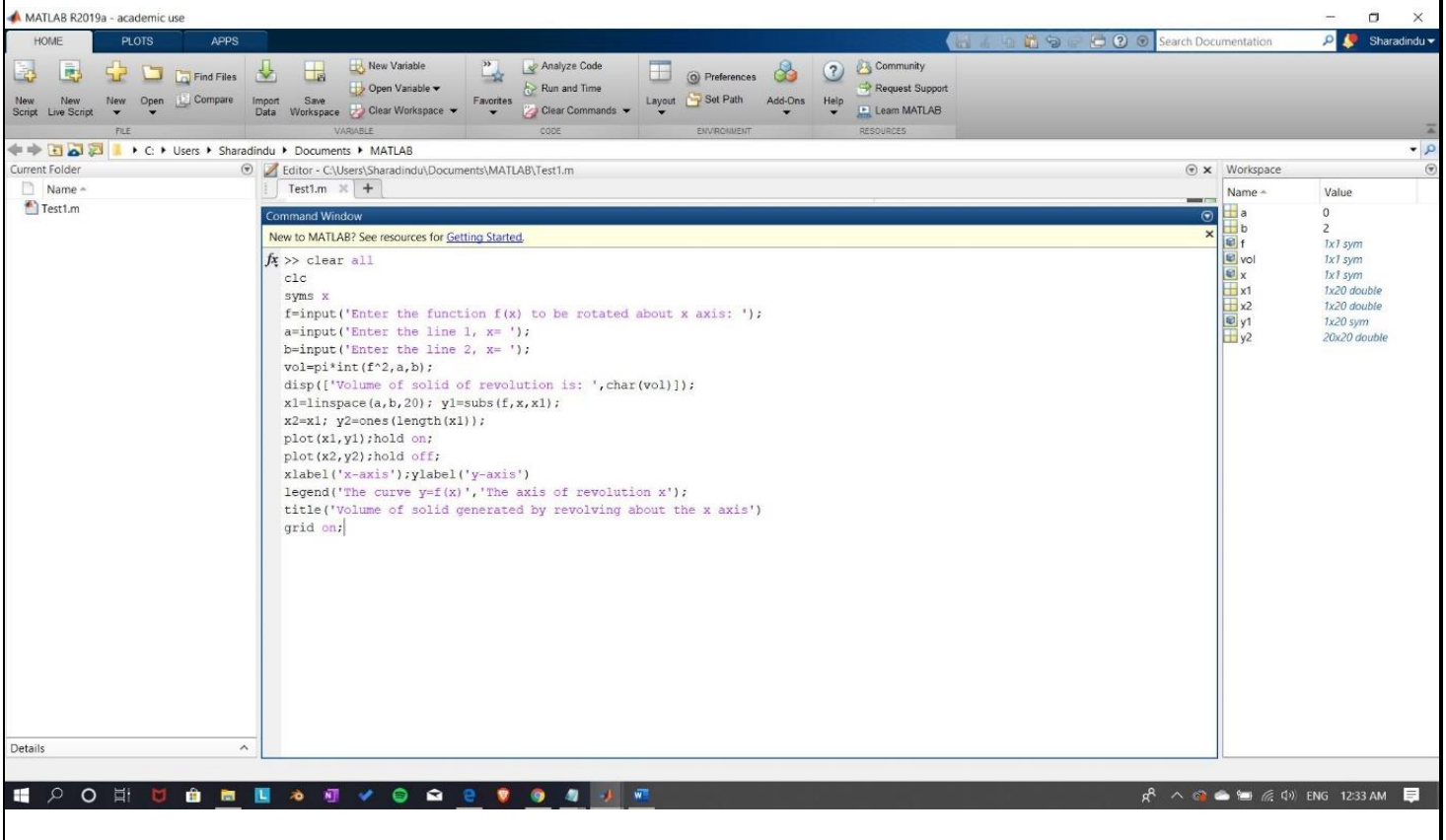
Problem:

Find the volume of the solid generated by revolving about the x-axis the region bounded by the curve $y = \frac{4}{x^2+4}$, the x-axis, and the lines $x = 0$ and $x = 2$.

Code in MATLAB:

```
clear all;
clc;
syms x
f=input('Enter the function f(x) to be rotated about x axis: ');
a=input('Enter the line 1, x= ');
b=input('Enter the line 2, x= ');
vol=pi*int(f^2,a,b);
disp(['Volume of solid of revolution is: ',char(vol)]);
x1=linspace(a,b,20); y1=subs(f,x,x1);
x2=x1; y2=ones(length(x1));
plot(x1,y1);hold on;
plot(x2,y2);hold off;
xlabel('x-axis');ylabel('y-axis')
legend('The curve y=f(x)', 'The axis of revolution x');
title('Volume of solid generated by revolving about the x axis');
grid on;
```

Screenshot of Code:



Input:

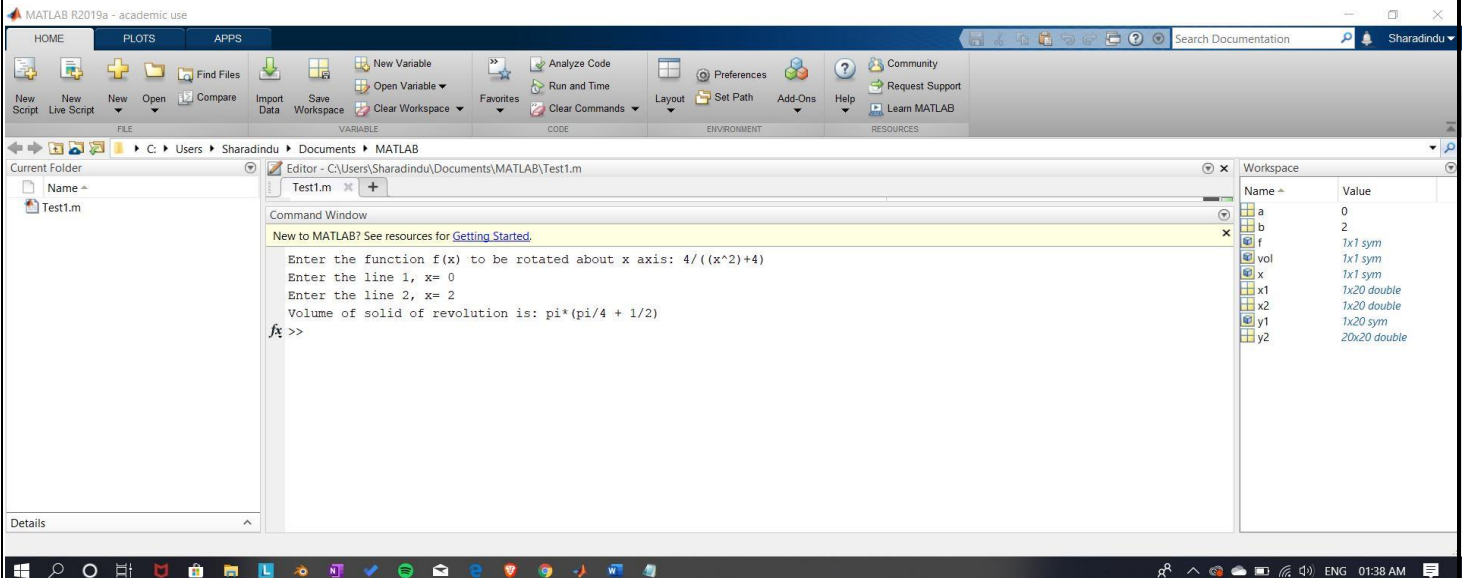
Enter the function $f(x)$ to be rotated about x axis: $4/((x^2)+4)$

Enter the line 1, $x= 0$

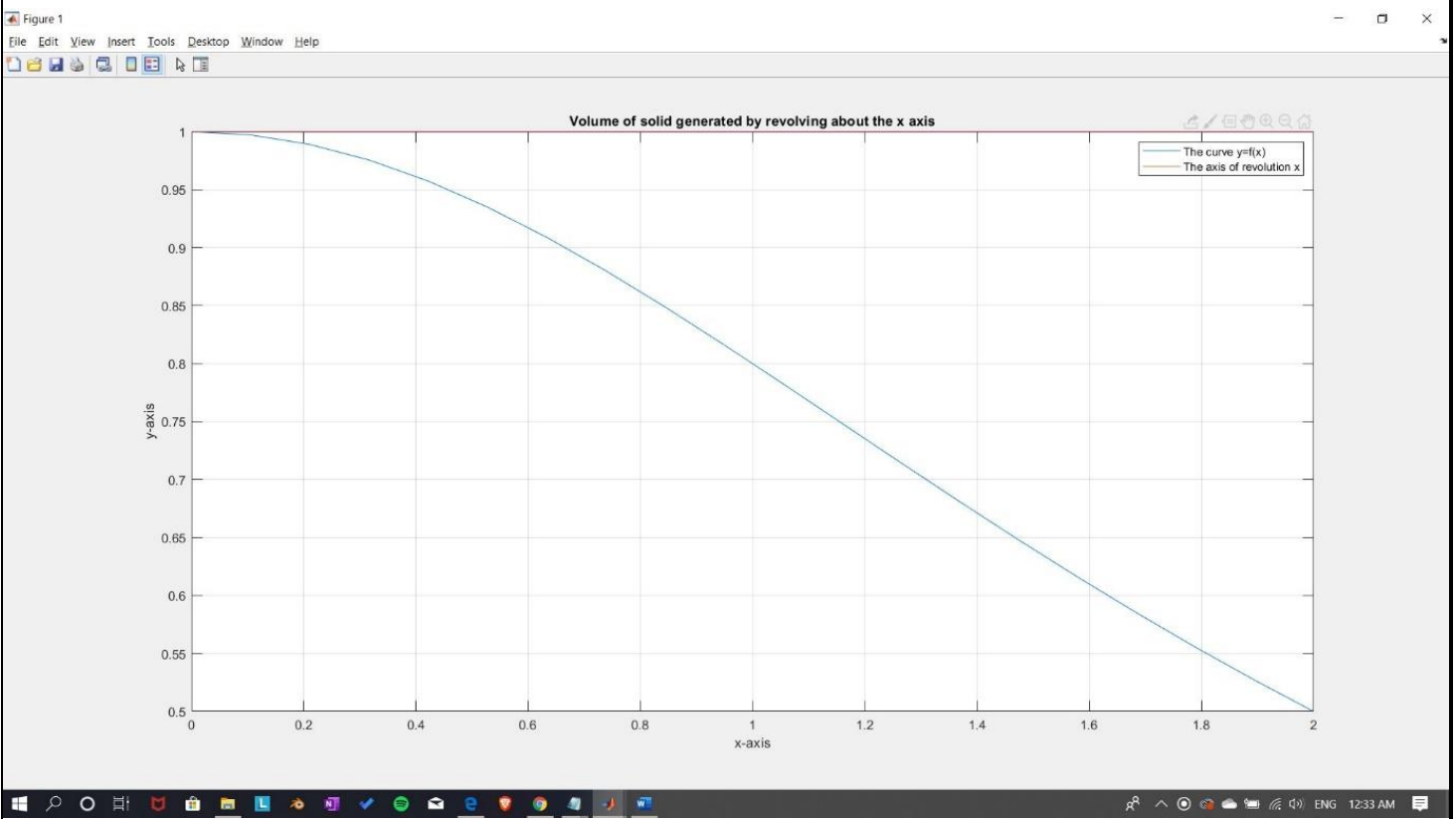
Enter the line 2, $x= 2$

Output:

Volume of solid of revolution is: $\pi \cdot (\pi/4 + 1/2)$



Graph:



Question 3

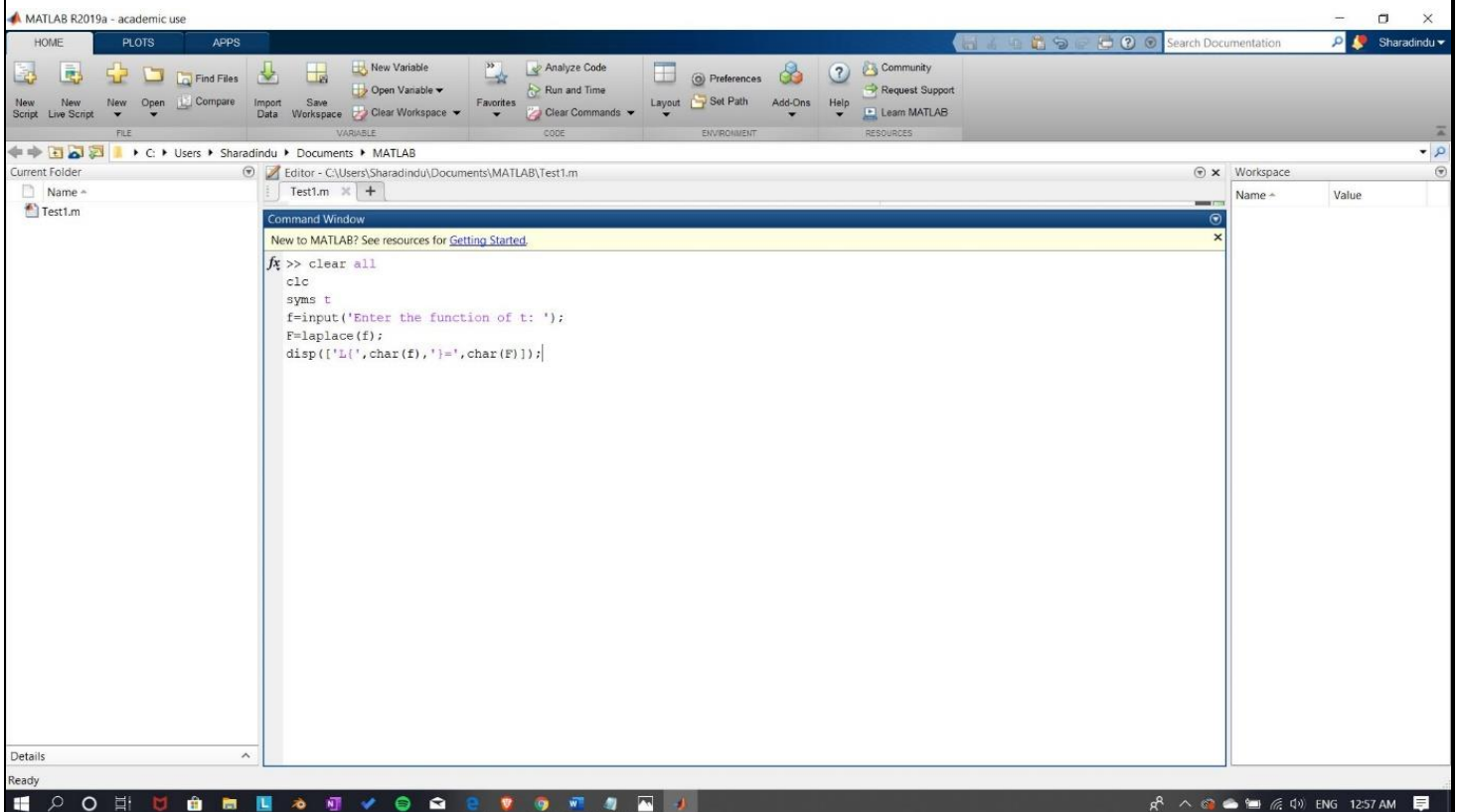
Problem:

Find the Laplace transform of the function $f(t) = \sin 2t \sin 3t$.

Code in MATLAB:

```
clear all
clc
syms t;
f=input('Enter the function of t: ');
F=laplace(f);
disp(['L{',char(f),'}=',char(F)]);
```

Screenshot of Code:

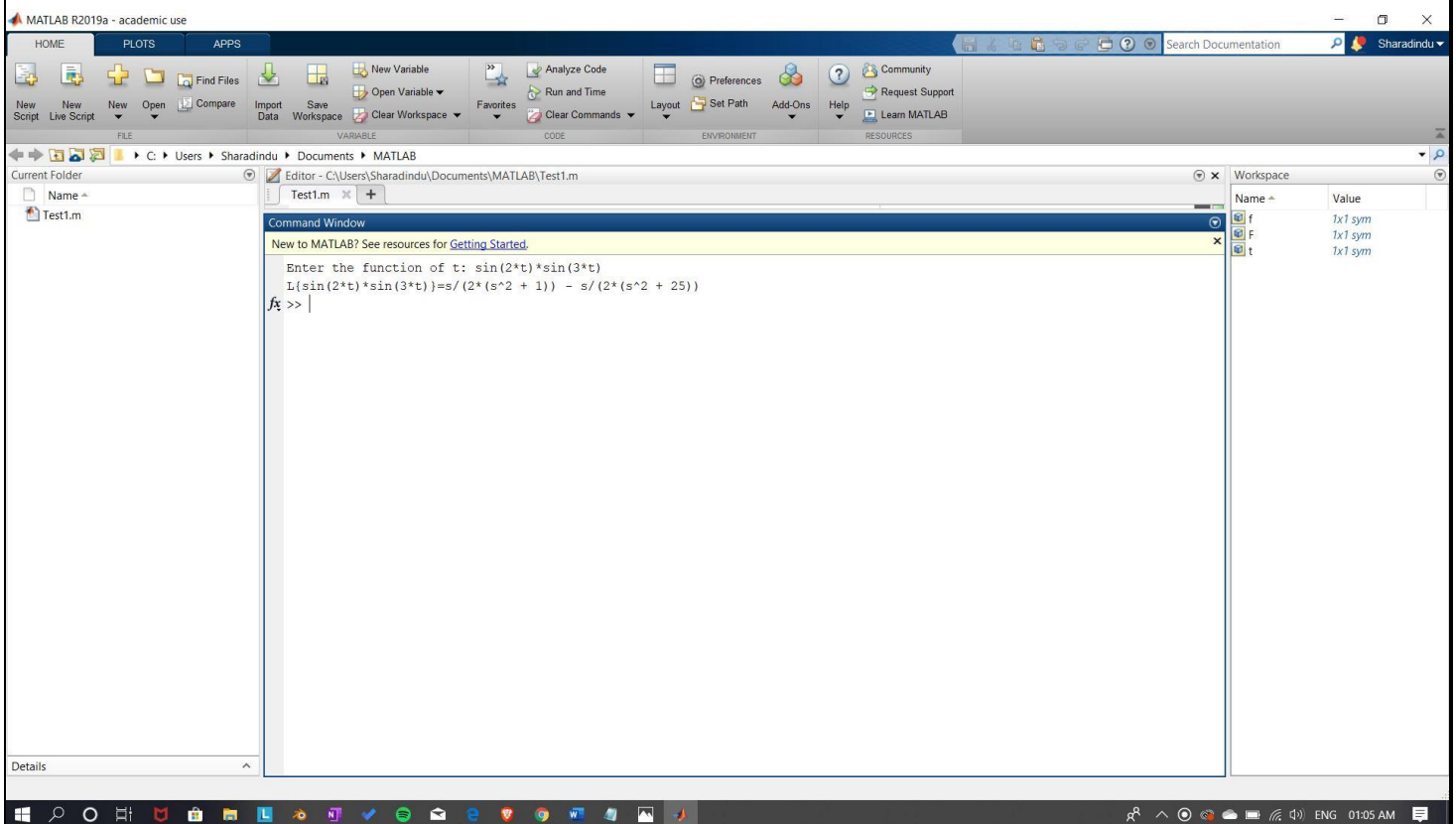


Input:

Enter the function of t: $\sin(2t)\sin(3t)$

Output:

$$\mathcal{L}\{\sin(2t)\sin(3t)\} = \frac{s}{2(s^2 + 1)} - \frac{s}{2(s^2 + 25)}$$



Question 4

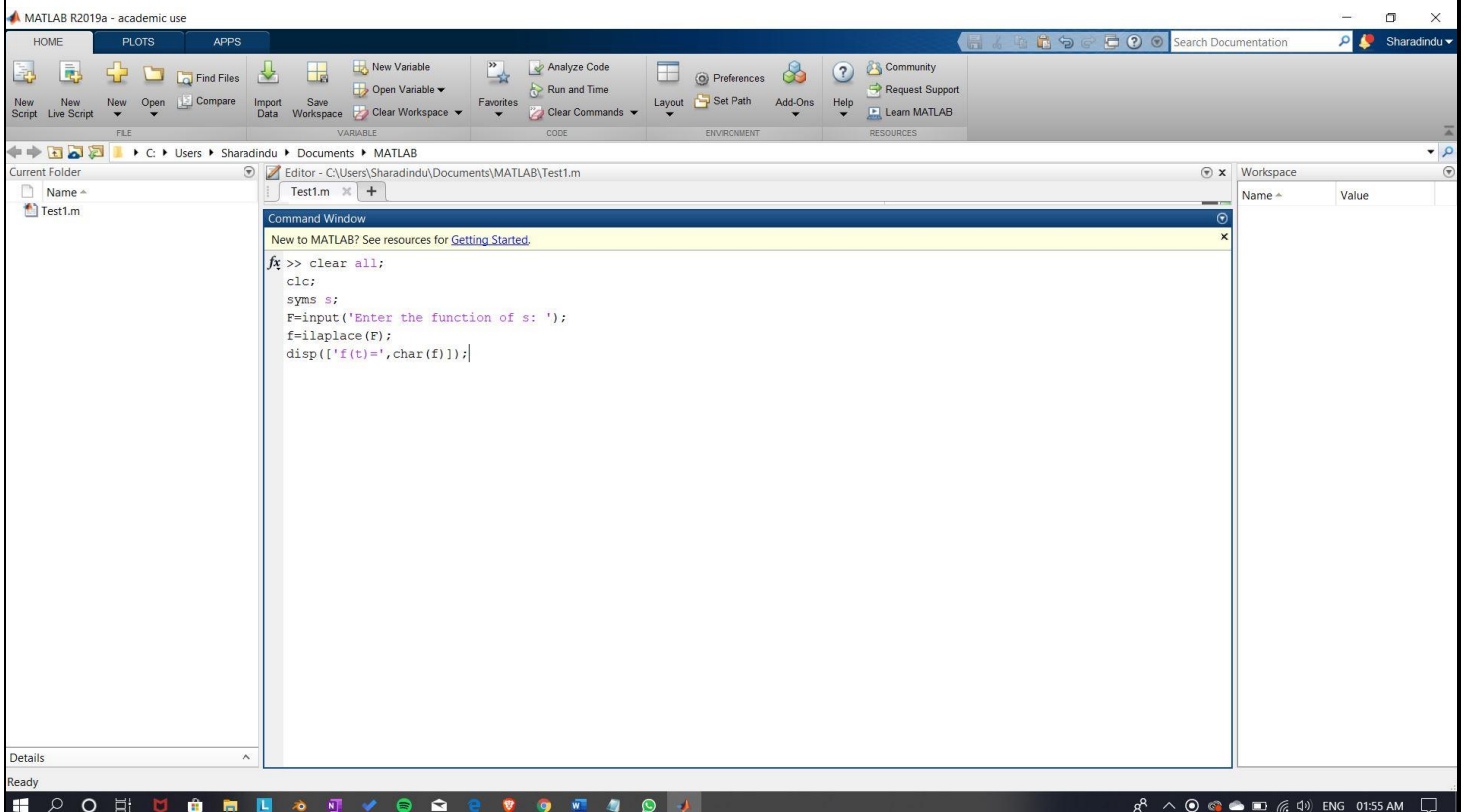
Problem:

Find the inverse Laplace transform of the function $F(s) = \frac{s^2+2s-4}{(s^2+2s+5)(s^2+2s+2)}$

Code in MATLAB:

```
clear all;
clc;
syms s;
F=input('Enter the function of s: ');
f=ilaplace(F);
disp(['f(t)=',char(f)]);
```

Screenshot of Code:

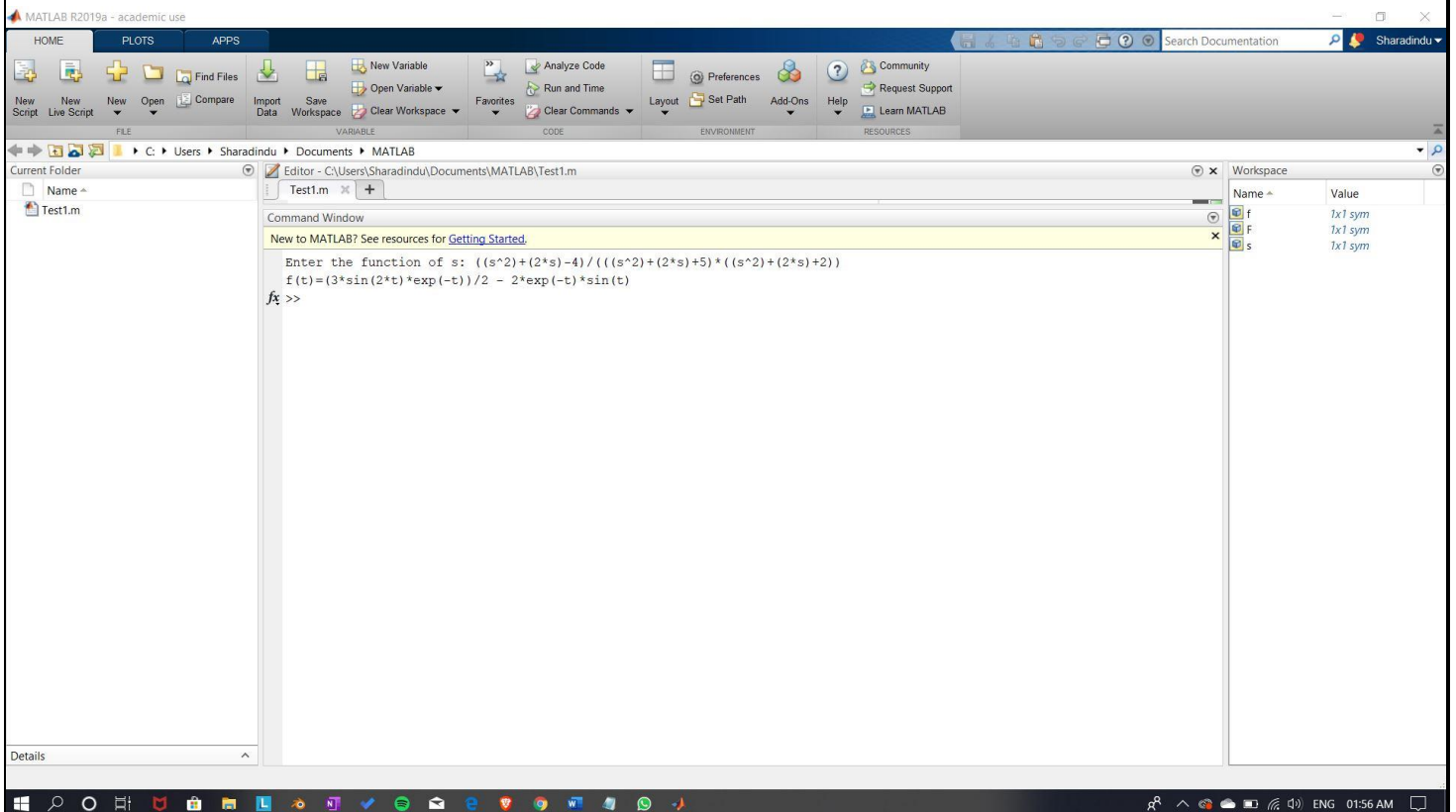


Input:

Enter the function of s: $((s^2)+(2*s)-4)/(((s^2)+(2*s)+5)*((s^2)+(2*s)+2))$

Output:

$$f(t)=(3*\sin(2*t)*\exp(-t))/2 - 2*\exp(-t)*\sin(t)$$



End