

**Digital Assignment SL. 3, Experiment – 2A: Applications of Integration: Finding Area,
volume of solid of revolution**

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Q1) Write a program to find the area of the region bounded by the curves $y^2 = x$, $y = x - 2$ in the first quadrant and visualize it.

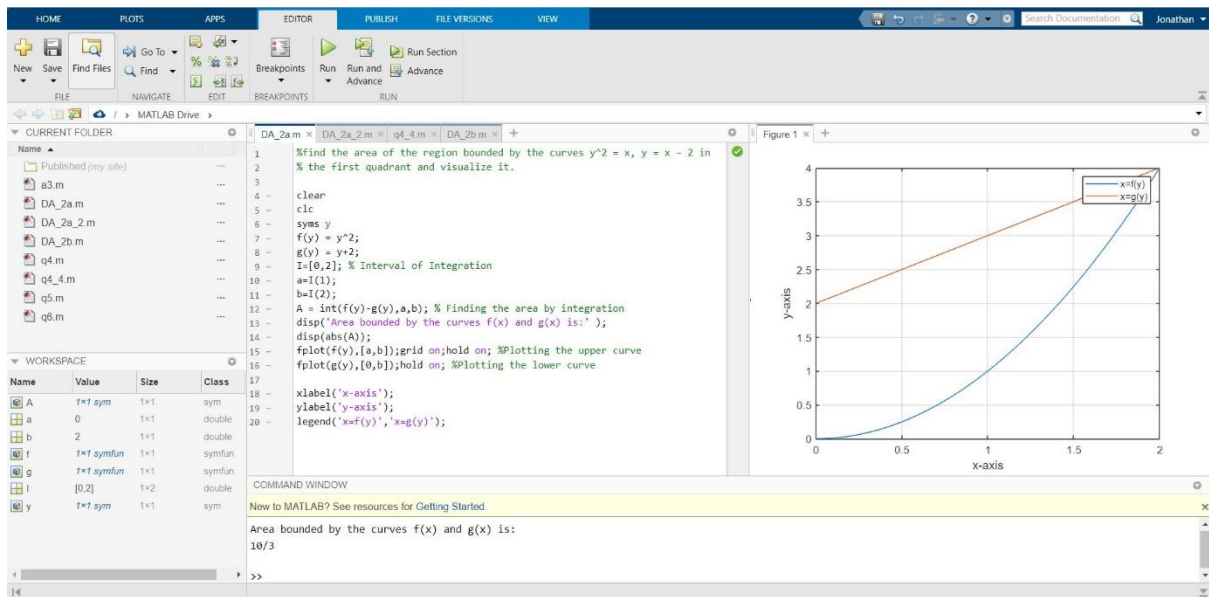
A: Code is as follows:

```
%find the area of the region bounded by the curves  $y^2 = x$ ,  $y = x - 2$  in  
% the first quadrant and visualize it.
```

```
clear  
clc  
syms y  
f(y) = y^2;  
g(y) = y+2;  
I=[0,2]; % Interval of Integration  
a=I(1);  
b=I(2);  
A = int(f(y)-g(y),a,b); % Finding the area by integration  
disp('Area bounded by the curves f(x) and g(x) is: ');  
disp(abs(A));  
fplot(f(y),[a,b]);grid on;hold on; %Plotting the upper curve  
fplot(g(y),[0,b]);hold on; %Plotting the lower curve  
  
xlabel('x-axis');  
ylabel('y-axis');  
legend('x=f(y)', 'x=g(y)');
```

Output (via Command Window):

```
Area bounded by the curves f(x) and g(x) is:  
10/3
```



Q2) Find the volume of the solid generated by revolving about the x-axis the region bounded by the curve $y = 4/((x^2)+4)$, the x-axis, and the lines $x = 0, x = 2$.

A: Code is as follows:

```

%Find the volume of the solid generated by revolving
% about the x-axis the region bounded by the curve  $y = 4/((x^2)+4)$ ,
% the x-axis, and the lines  $x = 0, x = 2$ .

```

```

clear all
clc
syms x
f(x) = 4/((x^2)+4);
yr = 0; % Axis of revolution y = 0
I = [0,2]; % Interval of integration between x=0 and x=2
a = I(1); b=I(2);
vol = pi*int((f(x)-yr)^2,a,b);
disp('Volume of solid of revolution is: ');
disp(vol);

```

```

% Visualization of solid of revolution
fx = matlabFunction(f);
xv = linspace(a,b,101); % Creates 101 points from a to b
[X,Y,Z] = cylinder(fx(xv)-yr);
Z = a+Z.*(b-a);

```

```

surf(Z,Y+yr,X) % Plotting the solid of revolution about y = yr (X-AXIS)
hold on;
plot([a b],[yr yr], '-r', 'LineWidth',2); % Plotting the line y=yr

```

```
view(22,11); % 3-D graph viewpoint specification
xlabel('X-axis');ylabel('Y-axis');zlabel('Z-axis');
```

Output (via Command Window):

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

