Dhruv Karmokar 21BAI1604

Lab Assignment - 3

1. Write a MATLAB code to evaluate the definite integrals, Riemann sums and compares it.

```
clc
clear all
syms x
f=input('enter the function f(x):');
a=input('enter lower limit of x');
b=input('enter the upper limit of x');
n=input('number of intervals');
value=0;
dx=(b-a)/n;
for k=1:n
c=a+k*dx;
d=subs(f,x,c);
value=value+d;
end
value=dx*value
figure(1)
ezplot(f,[a b])
z=int(f,a,b)
figure(2)
rsums(f, a, b)
```

Output:

```
enter the function f(x):x^2
enter lower limit of x 0
enter the upper limit of x 1
number of intervals 10

value =

77/200

z =

1/3
```

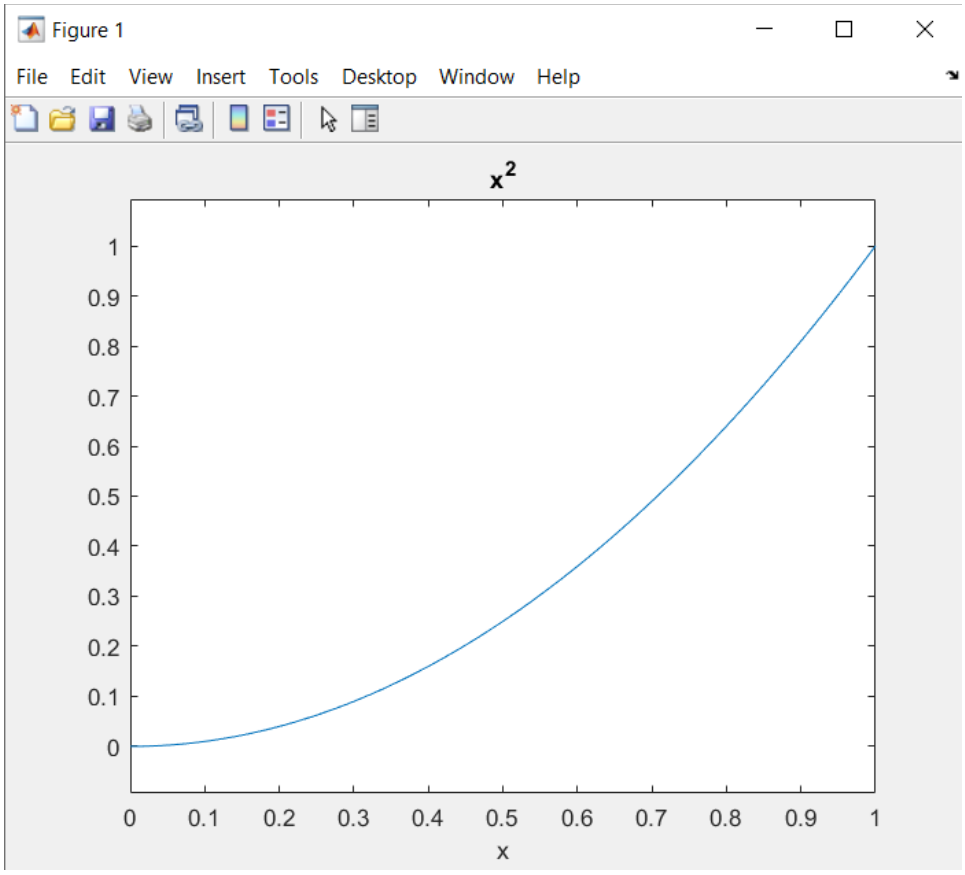


Figure 1
File Edit View Insert Tools Desktop Window Help
x^2
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
x

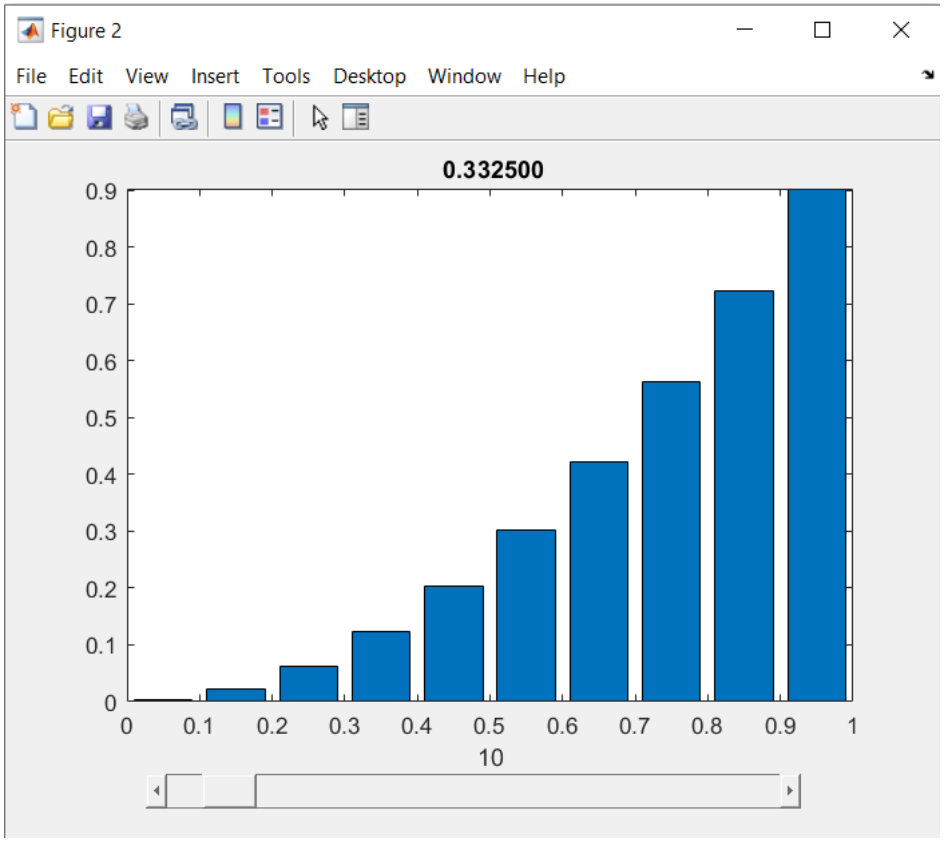


Figure 2
File Edit View Insert Tools Desktop Window Help
0.332500
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
10

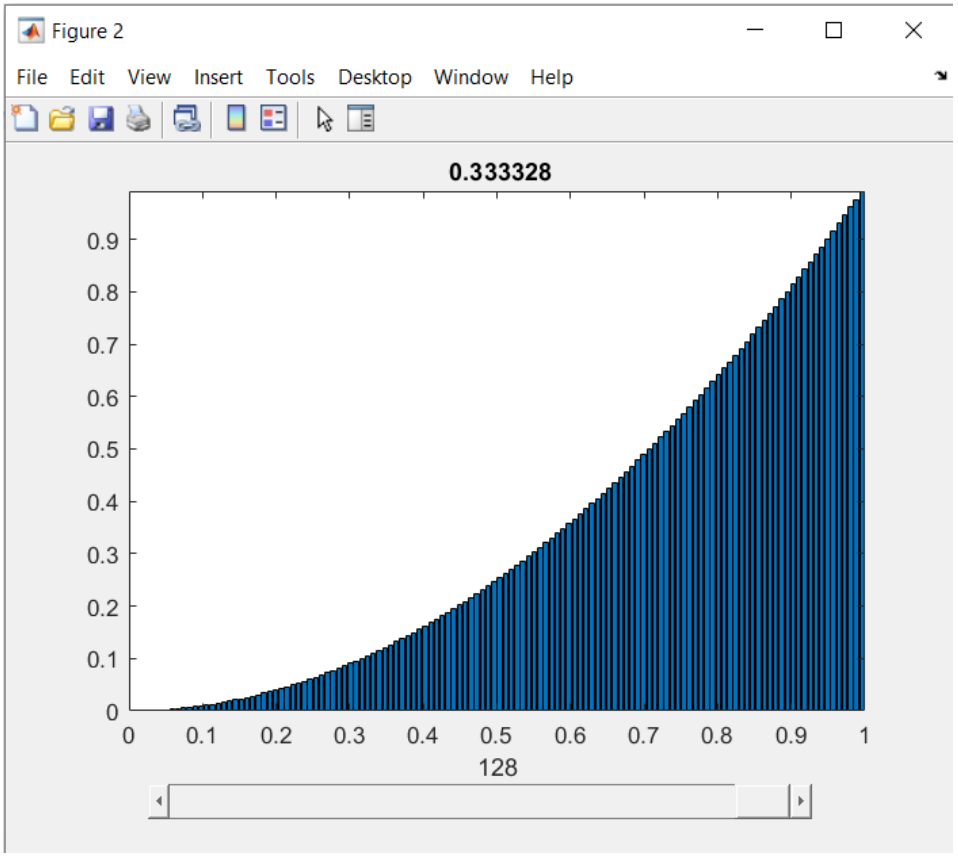
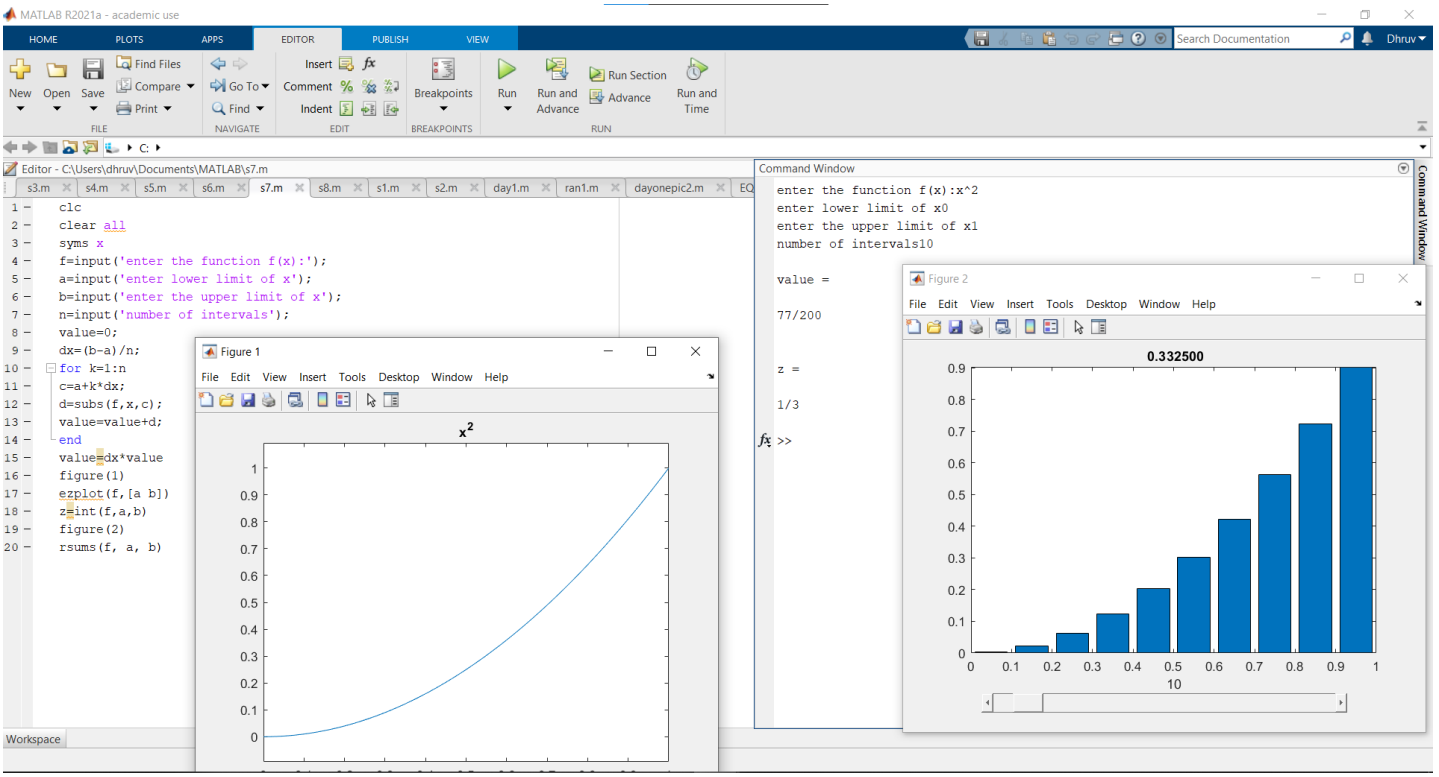


Figure 2
File Edit View Insert Tools Desktop Window Help
0.333328
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
128

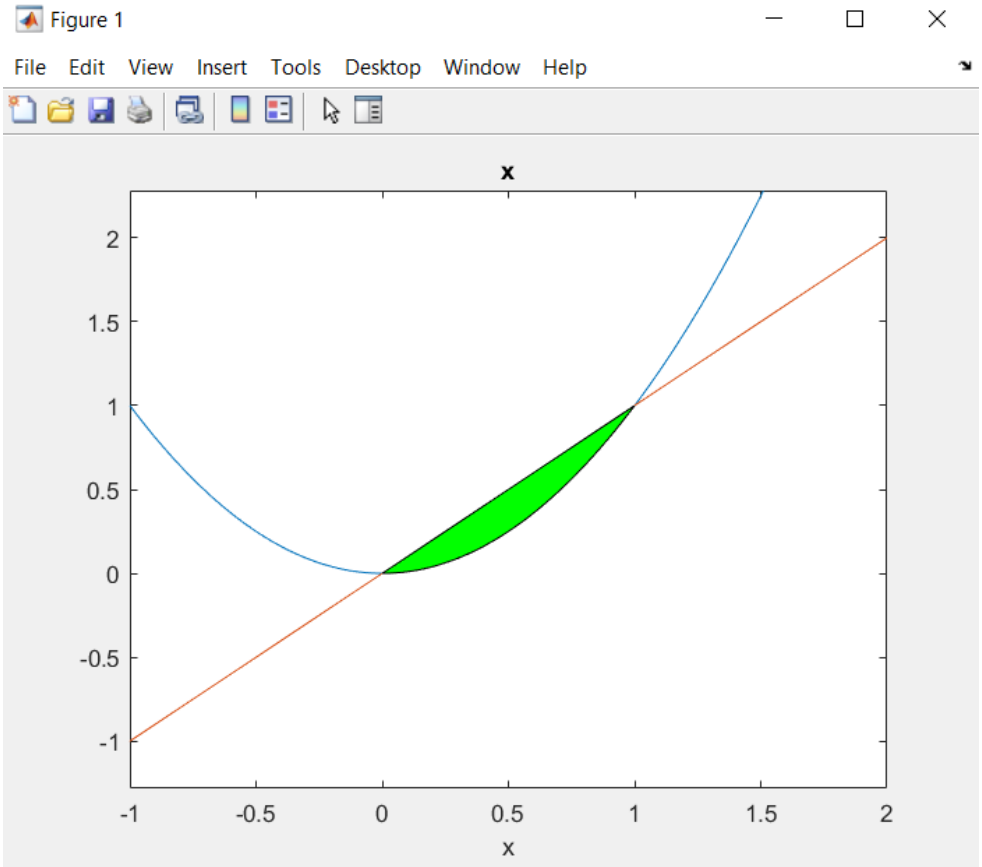

MATLAB R2021a - academic use
HOME PLOTS APPS EDITOR PUBLISH VIEW
Search Documentation
Dhruv
New Open Save Find Files Compare Print
Go To Find
Insert Comment Indent
Breakpoints
Run Run and Advance Run Section Advance Run and Time
FILE NAVIGATE EDIT BREAKPOINTS RUN
Editor - C:\Users\dhruv\Documents\MATLAB\s7.m
s3.m s4.m s5.m s6.m s7.m s8.m s1.m s2.m day1.m ran1.m dayonepic2.m
1 clc
2 clear all
3 syms x
4 f=input('enter the function f(x):');
5 a=input('enter lower limit of x');
6 b=input('enter the upper limit of x');
7 n=input('number of intervals');
8 value=0;
9 dx=(b-a)/n;
10 for k=1:n
11 c=a+k*dx;
12 d=subs(f,x,c);
13 value=value+d;
14 end
15 value=dx*value
16 figure(1)
17 ezplot(f,[a b])
18 z=int(f,a,b)
19 figure(2)
20 rsums(f, a, b)
Command Window
enter the function f(x):x^2
enter lower limit of x0
enter the upper limit of x1
number of intervals10
value =
77/200
z =
1/3
fx >>
Figure 1
File Edit View Insert Tools Desktop Window Help
x^2
Figure 2
File Edit View Insert Tools Desktop Window Help
0.332500
10
Workspace

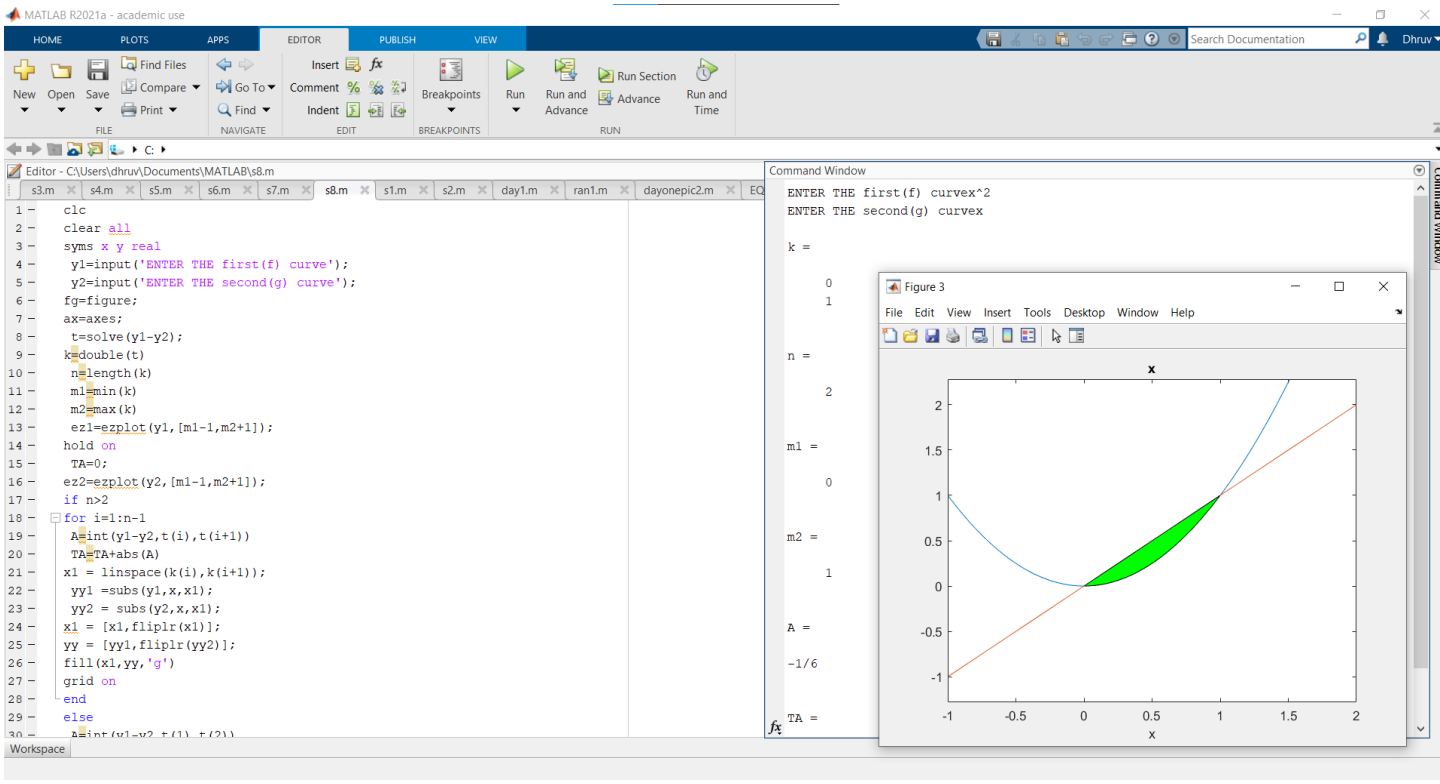
2. Write a MATLAB code to find the area of the regions enclosed by curves and visualize it.

```
clc
clear all
syms x y real
 y1=input('ENTER THE first(f) curve');
 y2=input('ENTER THE second(g) curve');
fg=figure;
ax=axes;
 t=solve(y1-y2);
k=double(t)
 n=length(k)
 m1=min(k)
 m2=max(k)
 ez1=ezplot(y1,[m1-1,m2+1]);
hold on
 TA=0;
ez2=ezplot(y2,[m1-1,m2+1]);
if n>2
for i=1:n-1
 A=int(y1-y2,t(i),t(i+1))
 TA=TA+abs(A)
x1 = linspace(k(i),k(i+1));
 yy1 =subs(y1,x,x1);
 yy2 = subs(y2,x,x1);
x1 = [x1,fliplr(x1)];
yy = [yy1,fliplr(yy2)];
fill(x1,yy,'g')
grid on
end
else
 A=int(y1-y2,t(1),t(2))
 TA=abs(A)
x1 = linspace(k(1),k(2));
 yy1 =subs(y1,x,x1);
 yy2 = subs(y2,x,x1);
x1 = [x1,fliplr(x1)];
yy = [yy1,fliplr(yy2)];
fill(x1,yy,'g')
End
```

Output:

```
ENTER THE first(f) curve x^2
ENTER THE second(g) curve x
k =
     0
     1
n =
     2
m1 =
     0
m2 =
     1
A =
-1/6
TA =
1/6
```




MATLAB R2021a - academic use
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
Dhruv
New
Open
Save
Find Files
Compare
Print
FILE
Go To
Find
NAVIGATE
Insert
Comment
Indent
EDIT
Breakpoints
BREAKPOINTS
Run
Run and Advance
Run Section
Advance
Run and Time
RUN
C:
Editor - C:\Users\dhruv\Documents\MATLAB\s8.m
s3.m
s4.m
s5.m
s6.m
s7.m
s8.m
s1.m
s2.m
day1.m
ran1.m
dayonepic2.m
1 clc
2 clear all
3 syms x y real
4 y1=input('ENTER THE first(f) curve');
5 y2=input('ENTER THE second(g) curve');
6 fg=figure;
7 ax=axes;
8 t=solve(y1-y2);
9 k=double(t)
10 n=length(k)
11 m1=min(k)
12 m2=max(k)
13 ez1=ezplot(y1,[m1-1,m2+1]);
14 hold on
15 TA=0;
16 ez2=ezplot(y2,[m1-1,m2+1]);
17 if n>2
18 for i=1:n-1
19 A=int(y1-y2,t(i),t(i+1))
20 TA=TA+abs(A)
21 x1 = linspace(k(i),k(i+1));
22 yy1 =subs(y1,x,x1);
23 yy2 = subs(y2,x,x1);
24 x1 = [x1,fliplr(x1)];
25 yy = [yy1,fliplr(yy2)];
26 fill(x1,yy,'g')
27 grid on
28 end
29 else
30 A=int(y1-y2,t(1),t(2))
Command Window
ENTER THE first(f) curvex^2
ENTER THE second(g) curvex
k =
0
1
n =
2
m1 =
0
m2 =
1
A =
-1/6
TA =
Figure 3
File Edit View Insert Tools Desktop Window Help
x
2
1.5
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5
2
x
Workspace