Lab Report No. 2

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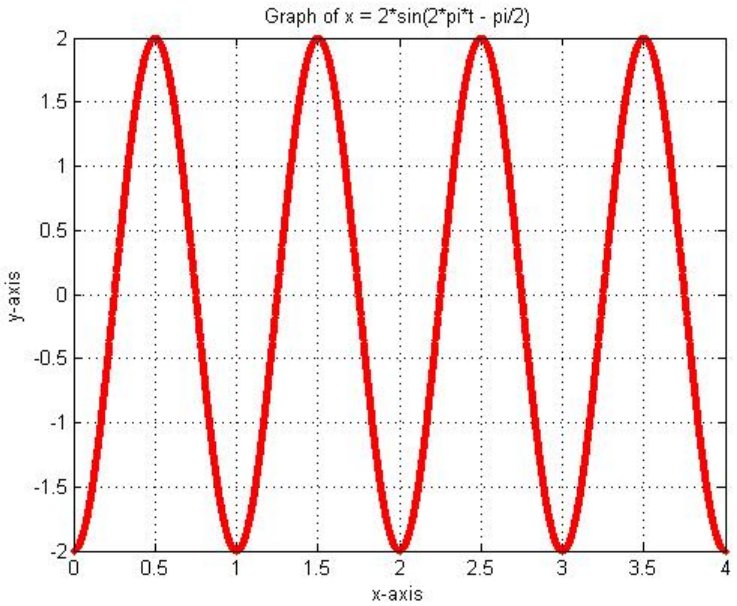
Registration no. 32903

1. $x(t) = 2 \sin (2\pi t - \pi/2)$ for $0 \leq t \leq 4$

Matlab Code:

```
clc;
clear all;
t= [0:0.001:4];
x = 2*sin(2*pi*t - pi/2);
plot(t,x,'r.')
axis([0 4 -2 2])
title('Graph of x = 2*sin(2*pi*t - pi/2)');
xlabel('x-axis');
ylabel('y-axis');
grid
```

Matlab Output:



2. Draw graphs of the functions

$y = \cos(x)$

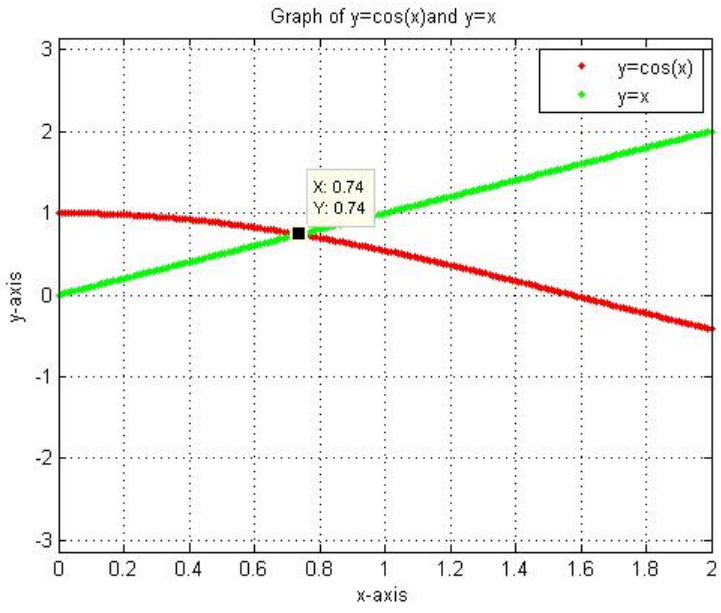
$y = x$

for $0 \leq x \leq 2$ in the same window. Use the zoom facility to determine the point of intersection of the two curves (and, hence, the root of $x = \cos(x)$) to two significant figures.

Matlab Code:

```
clc
clear all
x=[0:0.01:2];
y=cos(x);
plot(x,y, 'r.')
hold on
y=x;
plot(x,y, 'g.')
legend('y=cos(x)','y=x')
hold off
axis([0 2 -pi pi])
title('Graph of y=cos(x)and y=x')
xlabel('x-axis')
ylabel('y-axis')
grid
```

Matlab Output:



3. Draw graphs of the functions for x =0:0.1:10 and label your graph properly.

i. y = sin(x)/x

ii. u = (1/(x-1)2)+x

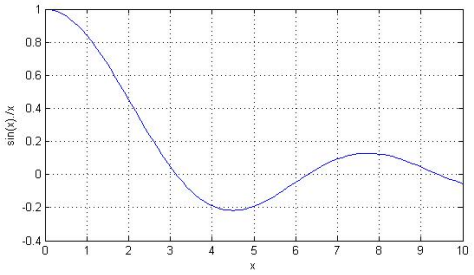
iii. v = (x2+1)/(x2-4)

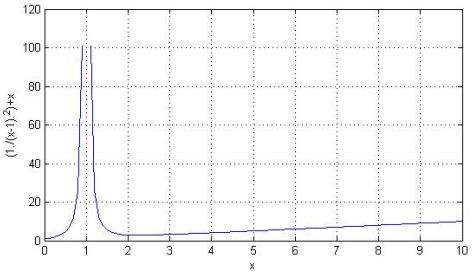
iv. z = ((10-x)1/3-1)/(4 - x2)1/2

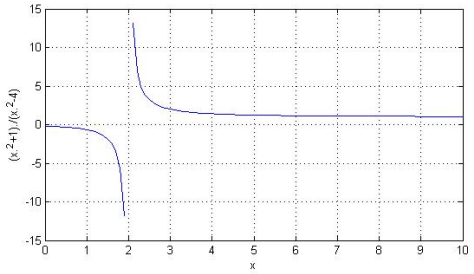
Matlab Code:

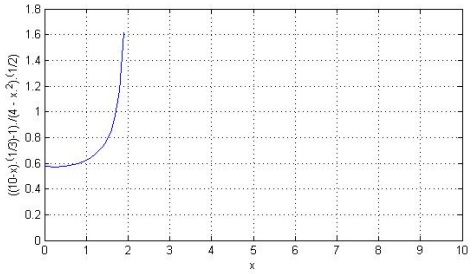
```
clc;
clear all;
x=[0:0.1:10];
y = sin(x)./x;
u = (1./(x-1).^2)+x;
v = (x.^2+1)./(x.^2-4);
z = ((10-x).^(1/3)-1)./(4 - x.^2).^(1/2);
subplot(221), plot(x,y)
xlabel('x'),ylabel('sin(x)./x')
grid
subplot(222), plot(x,u)
xlabel('x'),ylabel('(1./(x-1).^2)+x')
grid
subplot(223), plot(x,v)
xlabel('x'),ylabel('(x.^2+1)./(x.^2-4)')
grid
subplot(224), plot(x,z)
xlabel('x'),ylabel('((10-x).^(1/3)-1)./(4 - x.^2).^(1/2)')
grid
```

Matlab output:









Question by Sir Usman Ilyas:

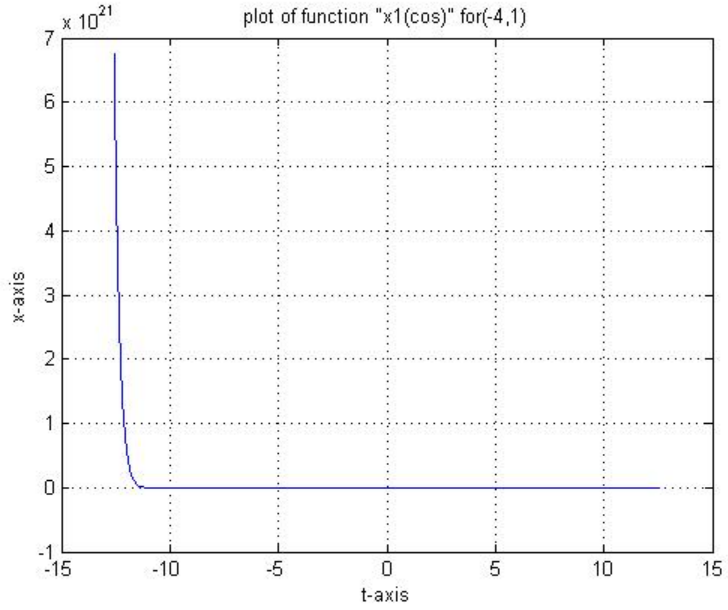
T = -4pi:0.01:4pi
Plot
-4,1
-1,1
0,1
1,4
1,1
1,0
1,-1
4,1
1,-4

Points on (t, x) plane.

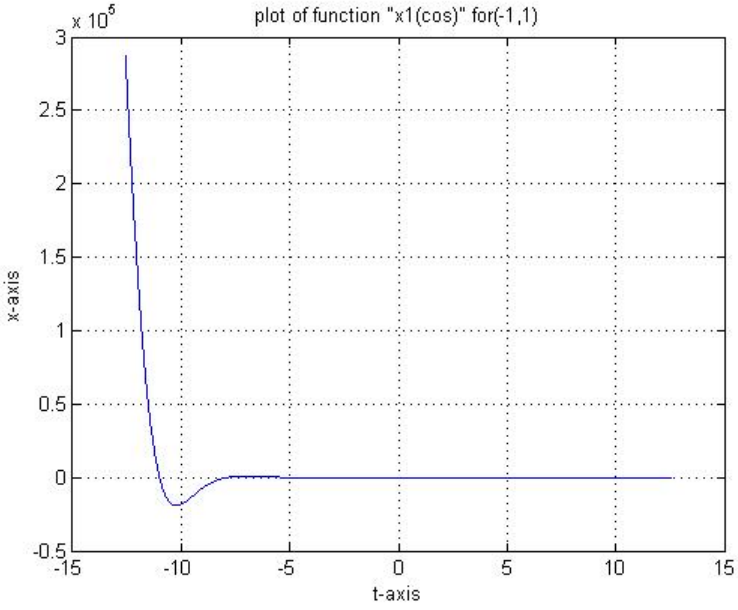
Matlab Code:

```
t=[-4*pi:0.01:4*pi];
a=-4; b=1;
x1=(exp(a*t)).*(cos(b*t));
x2=(exp(a*t)).*(sin(b*t));
plot(t,x1)
title('plot of function "x1(cos)" for(-4,1)')
xlabel('t-axis')
ylabel('x-axis')
grid
```

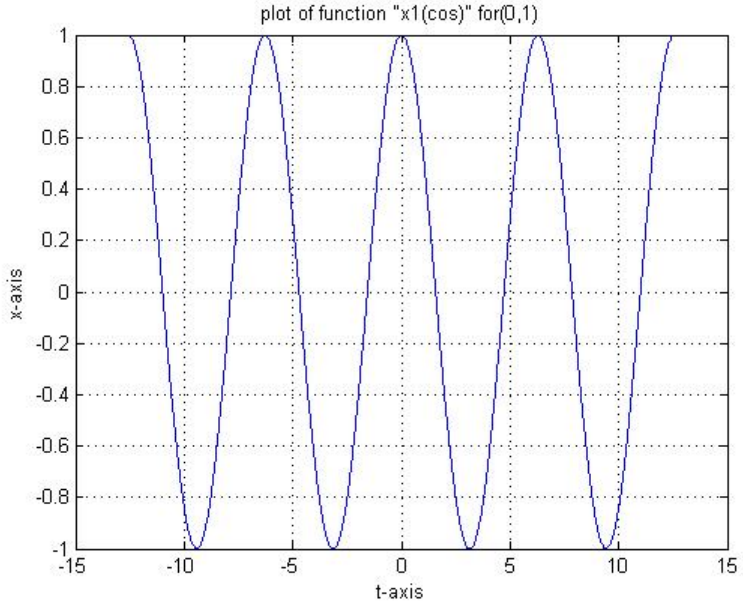
a)


plot of function "x1(cos)" for(-4,1)
x 10^21
x-axis
t-axis
7
6
5
4
3
2
1
0
-1
-15
-10
-5
0
5
10
15

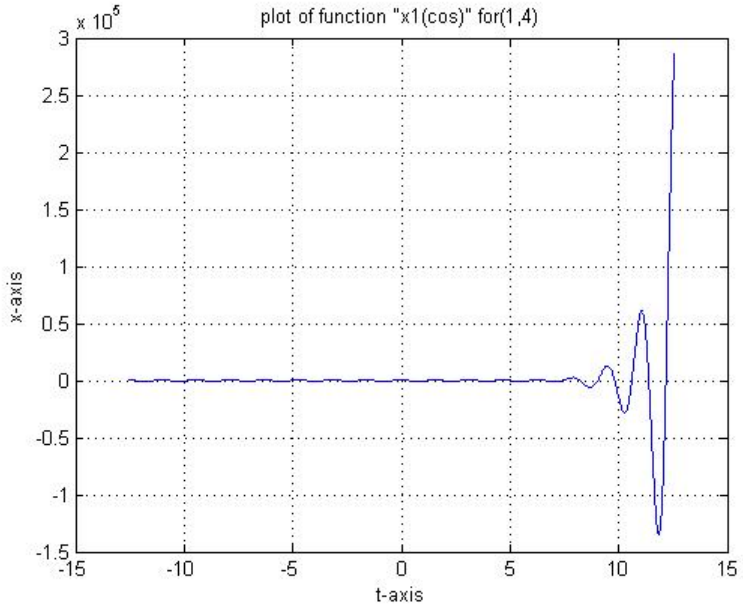
b)


plot of function "x1(cos)" for(-1,1)
x 10^5
x-axis
t-axis
3
2.5
2
1.5
1
0.5
0
-0.5
-15
-10
-5
0
5
10
15

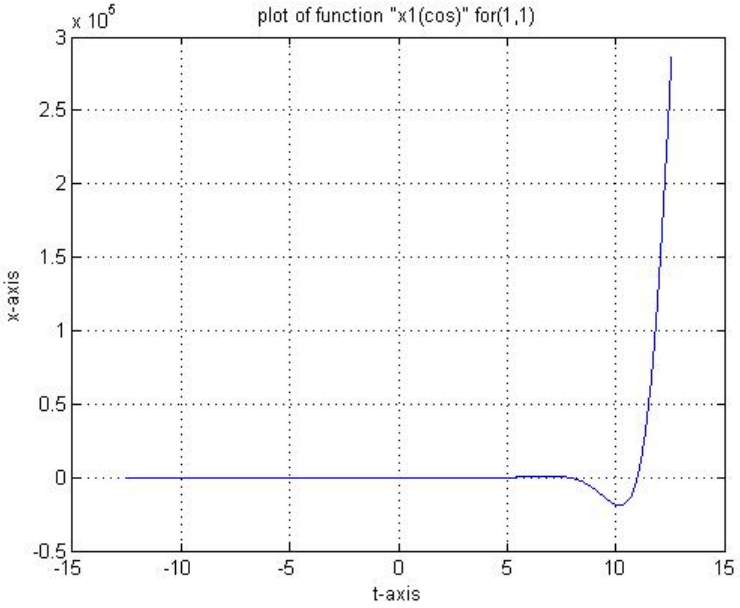
c)


plot of function "x1(cos)" for(0,1)
x-axis
t-axis
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-15
-10
-5
0
5
10
15

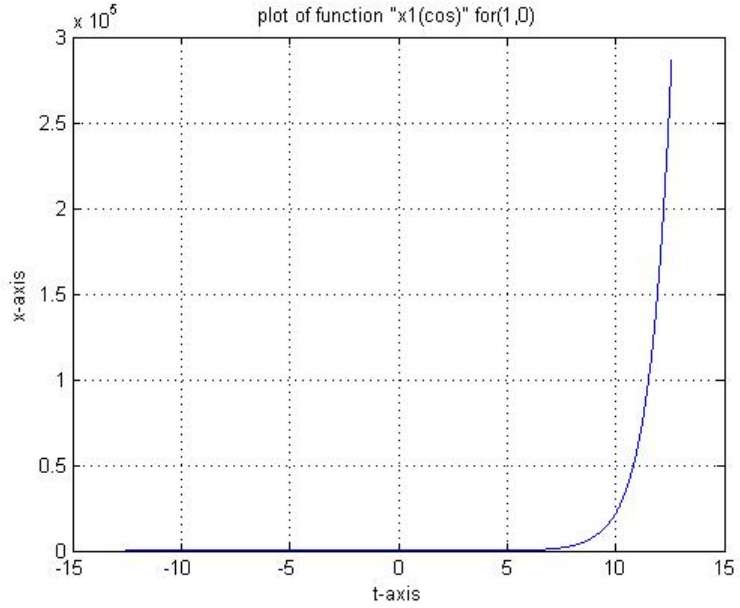
d)


x 10^5
plot of function "x1(cos)" for(1,4)
x-axis
t-axis
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-15
-10
-5
0
5
10
15

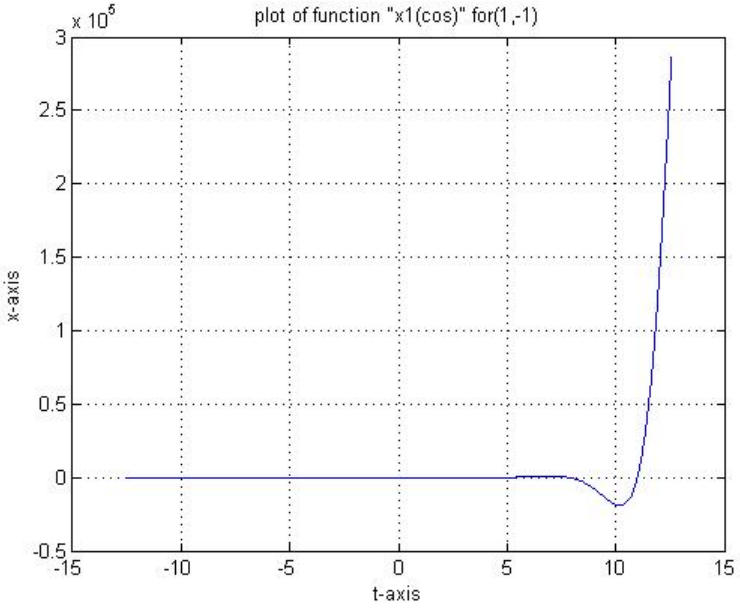
e)


plot of function "x1(cos)" for(1,1)
x 10^5
3
2.5
2
1.5
1
0.5
0
-0.5
x-axis
-15
-10
-5
0
5
10
15
t-axis

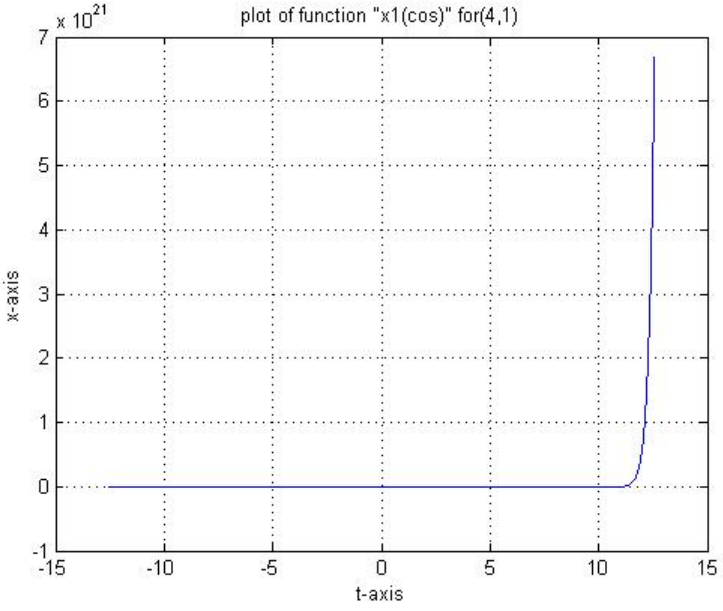
f)


plot of function "x1(cos)" for(1,0)
x 10^5
3
2.5
2
1.5
1
0.5
0
x-axis
-15
-10
-5
0
5
10
15
t-axis

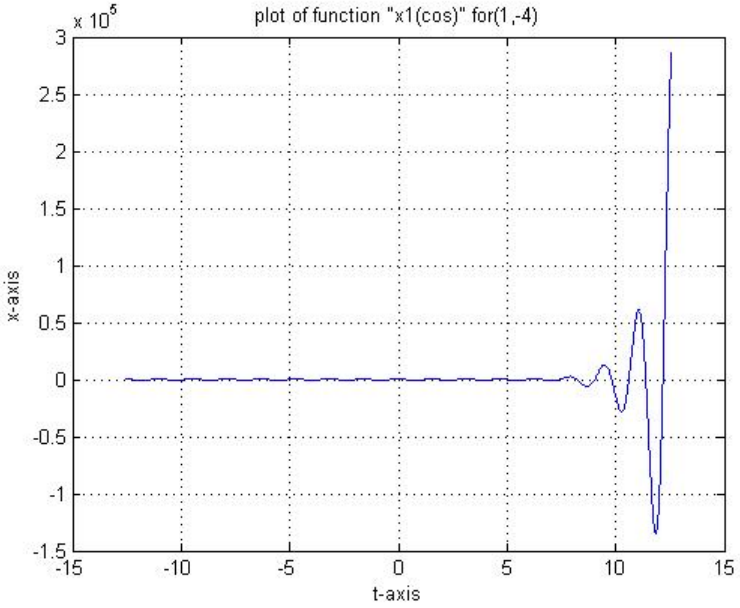
g)

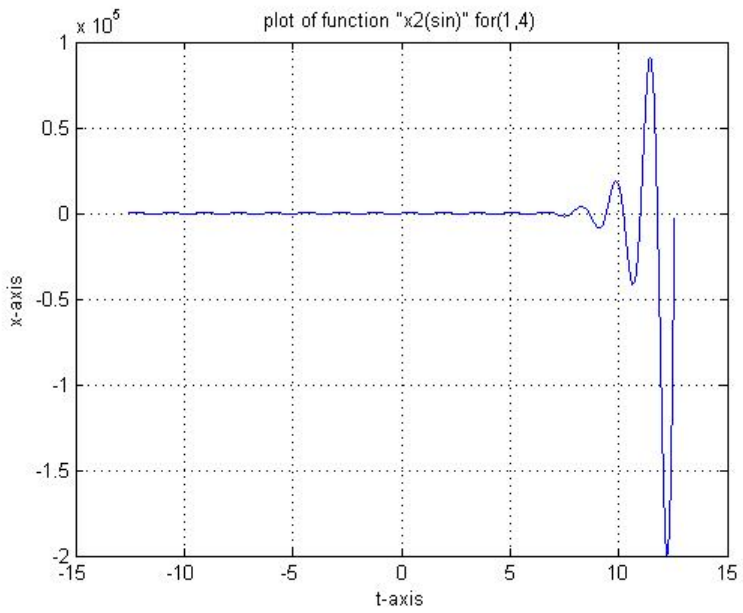

plot of function "x1(cos)" for(1,-1)
x 10^5
x-axis
t-axis
3
2.5
2
1.5
1
0.5
0
-0.5
-15
-10
-5
0
5
10
15

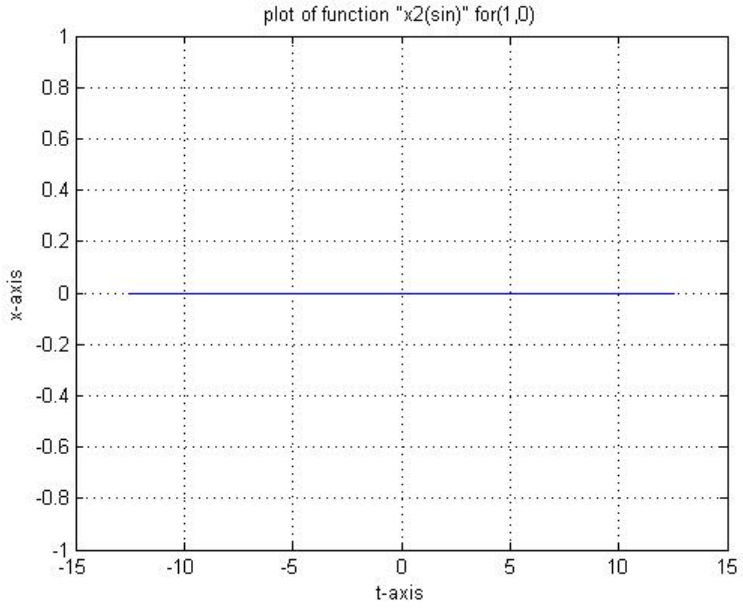
h)


plot of function "x1(cos)" for(4,1)
x 10^21
x-axis
t-axis
7
6
5
4
3
2
1
0
-1
-15
-10
-5
0
5
10
15

i)


plot of function "x1(cos)" for(1,-4)
x 10^5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
x-axis
-15
-10
-5
0
5
10
15
t-axis

- 
x 10^5
plot of function "x2(sin)" for(1,4)
x-axis
t-axis
1
0.5
0
-0.5
-1
-1.5
-2
-15
-10
-5
0
5
10
15

- 
plot of function "x2(sin)" for(1,0)
x-axis
t-axis
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-15
-10
-5
0
5
10
15