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Q1) Draw graph of the following function and its fourier series (with n=100 and n=50)

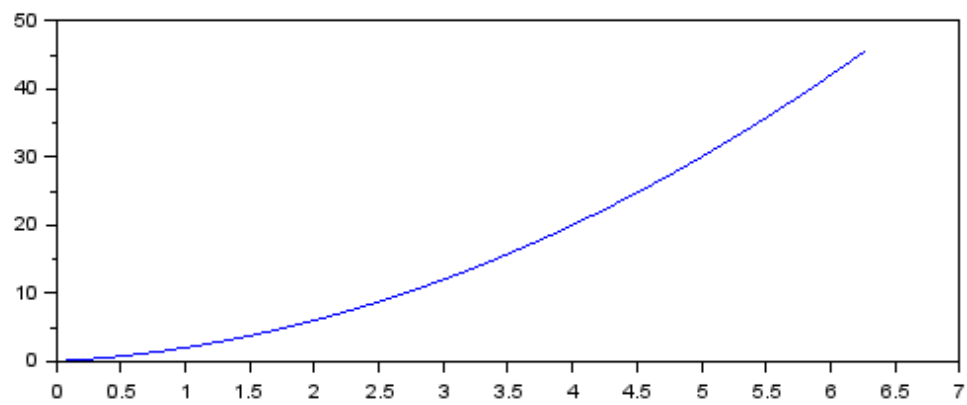
$$f(x) = x + x^2 \quad 0 \leq x \leq 2\pi$$

Code:

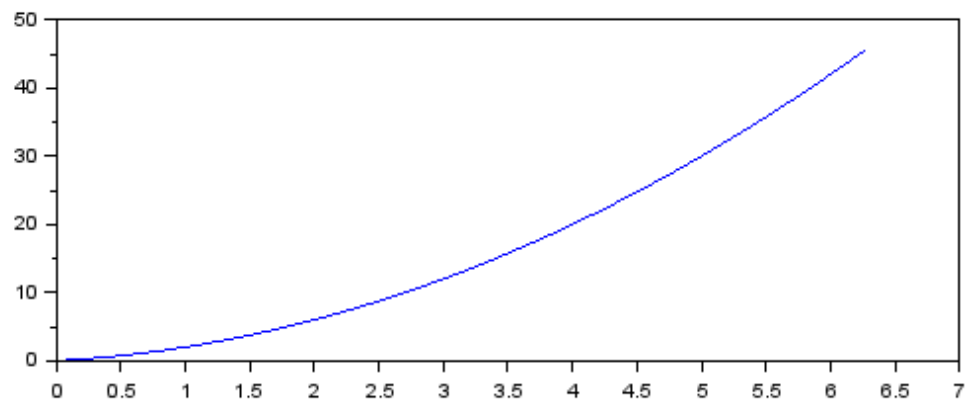
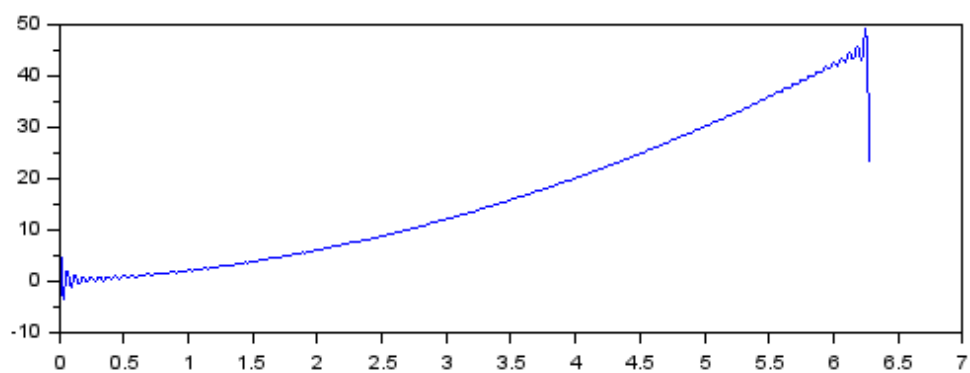
```

clc
L=%pi
x=0:0.01:2*L;
f=(x+((x)^2)); //define function f(x)
a0=(1/(2*L)*inttrap(x,f)); //define fourier constant
for n=1:50
f1=f.*cos(%pi*n*x*(1/L));
a(n)=(1/L)* inttrap(x,f1); //define fourier constant
end;
for n=1:50
f2=f.*sin(%pi*n*x*(1/L));
b(n)=(1/L)* inttrap(x,f2); //define fourier constant
end;
subplot(2,1,1), plot(x,f); // subplot(2,1,1)-in display 2 rows &
//1column,'1'represnts first graph of function;
u=0; y=0;
for n=1:50
u= a(n)*cos(%pi*n*x*(1/L))+ b(n)* sin(%pi*n*x*(1/L));
y=y+u;
end;
fs=y+ a0;
subplot(2,1,2), plot(x,fs); // subplot(2,1,2)-in display 2 rows &
//1column,'2'represnts second graph of fourier series
title('NIKHIL PATIL 16010122136 GRAPH1 if n=50','fontsize',5)

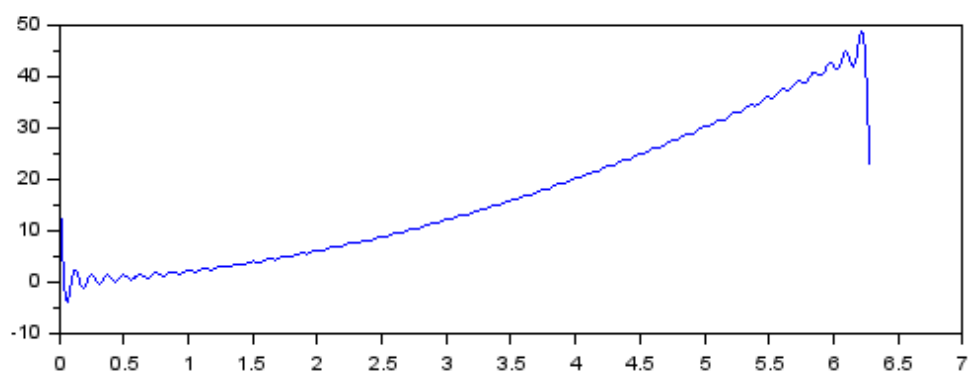
```



NIKHIL PATIL 16010122136 GRAPH1 if $n=100$



NIKHIL PATIL 16010122136 GRAPH1 if $n=50$

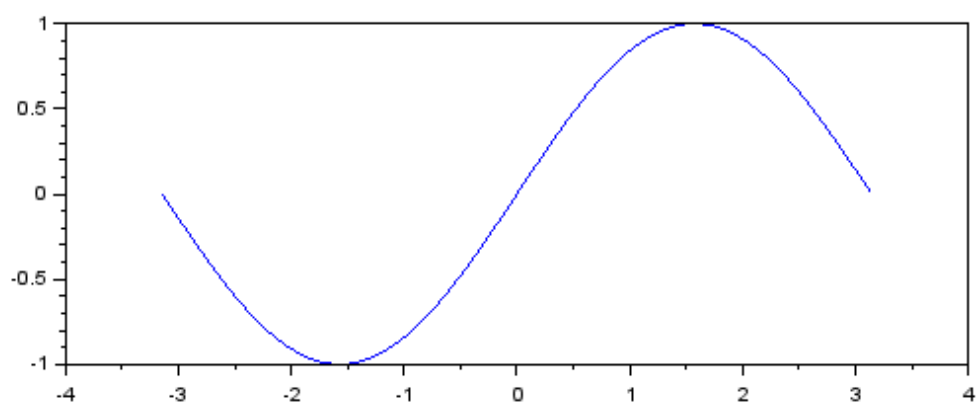


Q2) Draw graph of the following function and its fourier series (with n=20 and n=5)

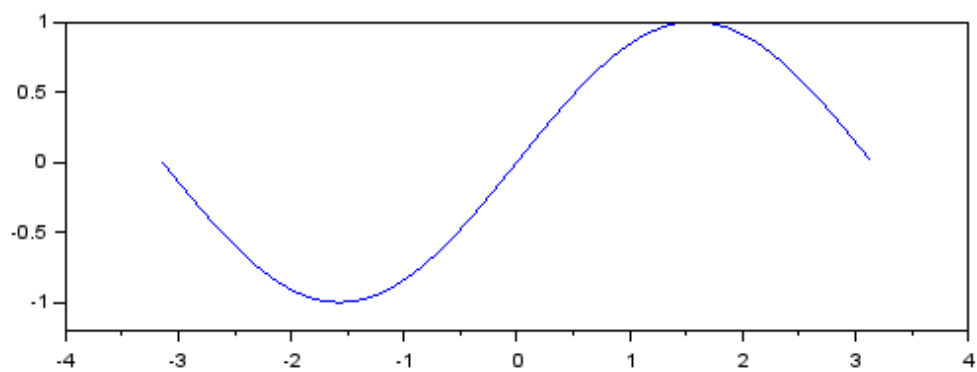
$$f(x) = \sin x \quad -\pi \leq x \leq \pi$$

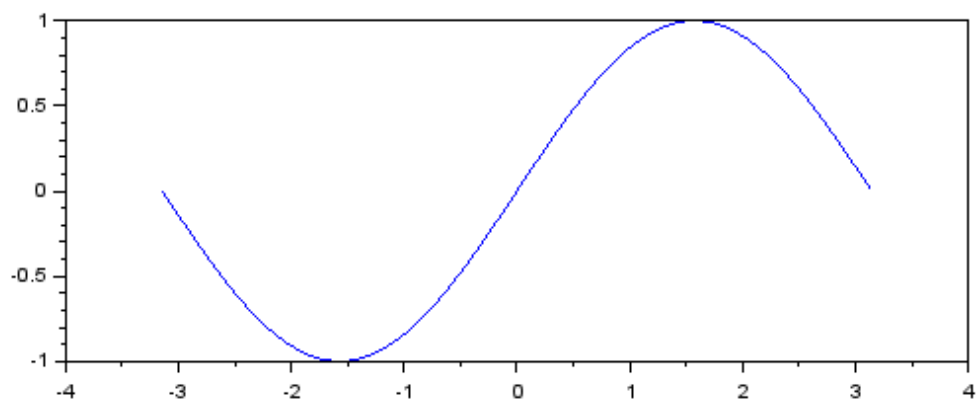
Code:

```
clc
L=%pi
x=-L:0.01:L;
f= sin(x); //define function f(x)
a0=(1/(2*L)*inttrap(x,f)); //define fourier constant
for n=1:5
f1=f.*cos(%pi*n*x*(1/L));
a(n)=(1/L)* inttrap(x,f1); //define fourier constant
end;
for n=1:5
f2=f.*sin(%pi*n*x*(1/L));
b(n)=(1/L)* inttrap(x,f2); //define fourier constant
end;
subplot(2,1,1), plot(x,f); // subplot(2,1,1)-in display 2 rows &
//1column,'1'represnts first graph of function;
u=0; y=0;
for n=1:5
u= a(n)*cos(%pi*n*x*(1/L))+ b(n)* sin(%pi*n*x*(1/L));
y=y+u;
end;
fs=y+ a0;
subplot(2,1,2), plot(x,fs); // subplot(2,1,2)-in display 2 rows &
//1column,'2'represnts second graph of fourier series
title('NIKHIL PATIL 16010122136 GRAPH1 if n=5','fontsize',5)
```



NIKHIL PATIL 16010122136 GRAPH1 if $n=20$





NIKHIL PATIL 16010122136 GRAPH1 if $n=5$

