# Question 03

## Code

clc

clear

close all

time=linspace(0,12,13);

Depth=[0 2 5 8 15 28 32 49 57 68 110 109 130];

velocity\_forword=[];

for i=1:length(time)-1

velocity\_forword(i)=Depth(i+1)-Depth(i);

end

velocity\_backword=[];

for i=2:length(time)

velocity\_backword(i-1)=Depth(i)-Depth(i-1);

end

velocity\_centered=[];

for i=2:length(time)-1

velocity\_centered(i-1)=(Depth(i+1)-Depth(i-1))/2;

end

acc\_centered=[];

for i=2:length(time)-1

acc\_centered(i-1)=Depth(i+1)-2\*Depth(i)+Depth(i-1);

end

acc\_backword=[];

for i=3:length(time)

acc\_backword(i-2)=Depth(i)-2\*Depth(i-1)+Depth(i-2);

end

acc\_forwrod=[];

for i=1:length(time)-2

acc\_forwrod(i)=Depth(i+1)-2\*Depth(i+1)+Depth(i);

end

velocity\_forword

velocity\_backword

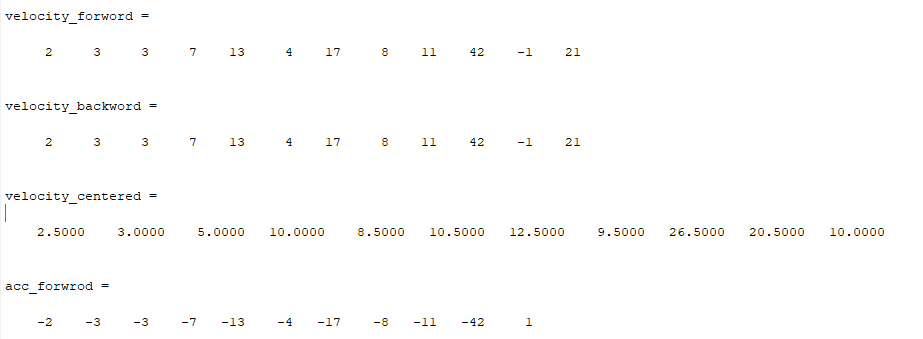
velocity\_centered

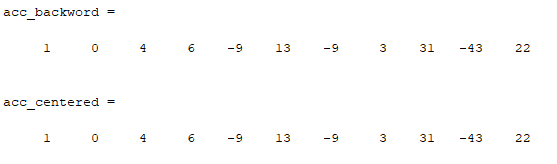
acc\_forwrod

acc\_backword

acc\_centered

## Output





# Question 04

## Code

clc

clear all;

close all

XYZ=136

f=@(x)(-3.8\*(x -XYZ)^2 -8.6\*(x -XYZ) -500-XYZ);

a=f(0);

f=@(x)(-3.8\*(x -XYZ)^2 -8.6\*(x -XYZ) -800-XYZ);

b=f(0);

c =8;

iteration=50;

itera\_rect = (zeros(1,iteration));

itera\_trapz = (zeros(1,iteration));

itera\_simp = (zeros(1,iteration));

for i = 1:iteration

temp = (b-a)/i;

rect\_sum = 0;

for p = 1:i

X = a + p\*(temp)-(temp/2);

Y = sqrt(((X^2)-(c^2)))/X;

rect\_sum = rect\_sum + Y\*temp;

end

itera\_rect(i) = rect\_sum;

temp = (b-a)/(i-1);

trapz\_sum = 0;

for q = 1:i

X = a + ((q-1)\*temp);

Y = sqrt(((X^2)-(c^2)))/X;

if (q == 0)||(q == i)

coeff = 0.5;

else

coeff = 1;

end

trapz\_sum = trapz\_sum + (coeff\*Y\*temp);

end

itera\_trapz(i) = trapz\_sum;

simp\_sum = 0;

for r = 1:i

X = a + ((r-1)\*temp);

Y = sqrt(((X^2)-(c^2)))/X;

if (mod(r,2) == 0)

coeff = 4;

else

coeff = 2;

end

if (r == 0)||(r == i)

coeff = 1;

end

simp\_sum = simp\_sum + (coeff\*Y\*temp\*(1/3));

end

itera\_simp(i) = simp\_sum;

end

plot(itera\_rect)

hold on;

plot(itera\_trapz);

hold on;

title('Error in surface area with all method');

xlabel('===>Iteration');

ylabel ('====>Error Values');

plot(itera\_simp);

hold on

legend('Rectangle Method','Trapeziod','Simpson Rule');

grid on;

## Output

