LAB NUMBER 4
COURSE: EMBEDDED SYSTEMS DESIGN
SUBJECT: MATHEMATICS FOR EMBEDDED SYSTEM
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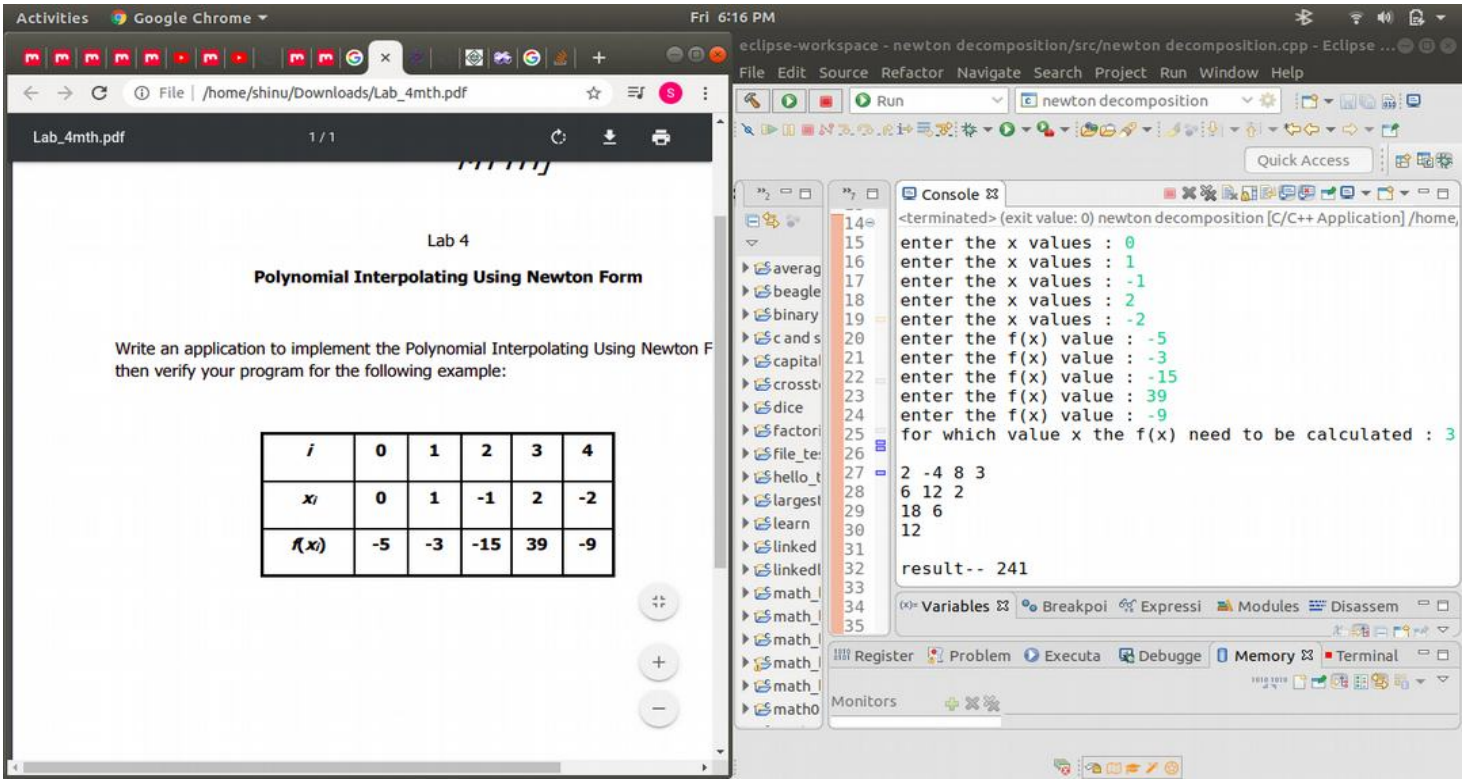
POLYNOMIAL INTERPOLATING USING NEWTON FORM

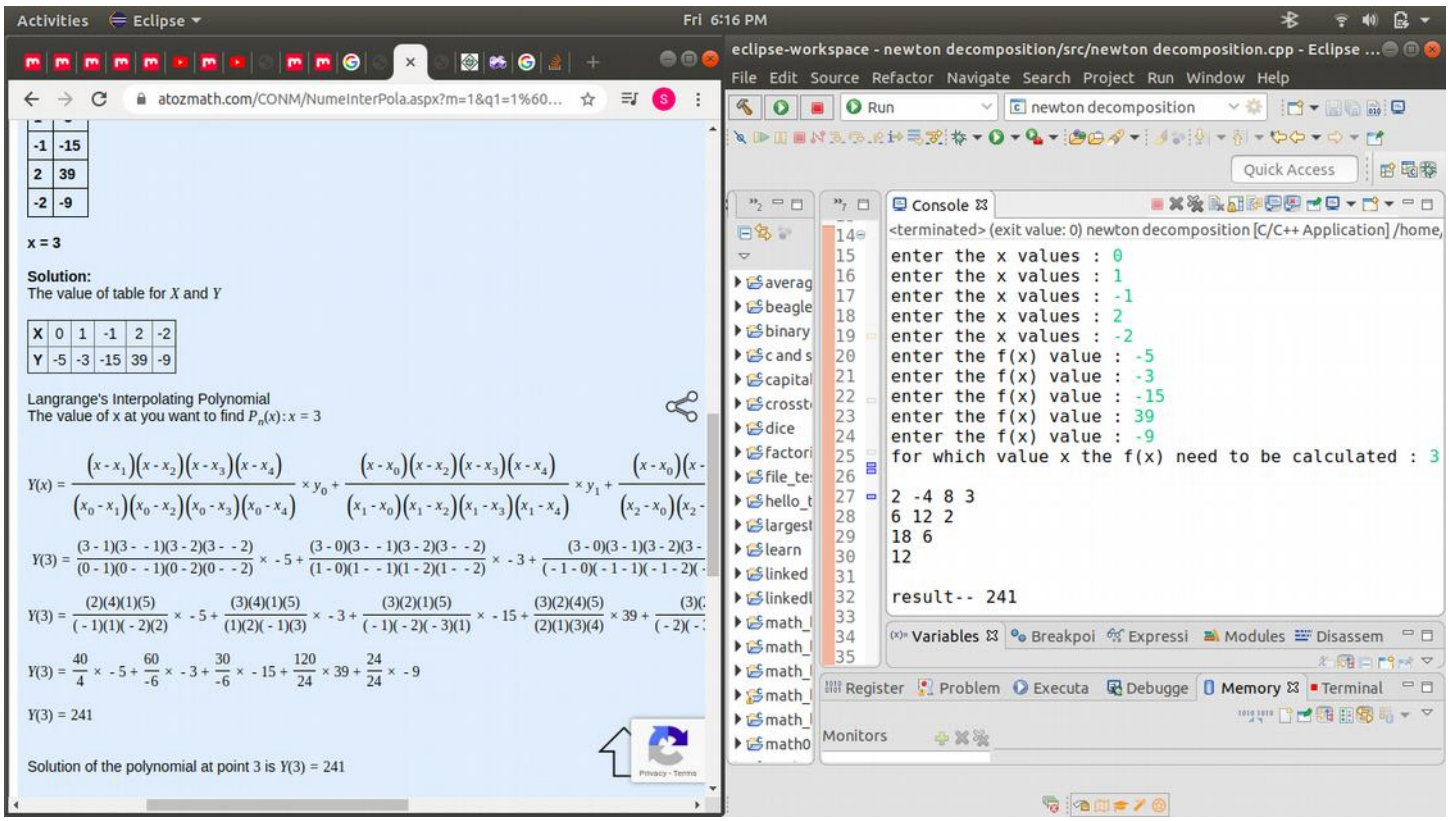
CODE:

```
//
============================================================================
=======
// Name        : newton.cpp
// Author      : shinu & stebin
// Version     :
// Copyright   : Your copyright notice
// Description : Hello World in C++, Ansi-style
//
============================================================================
=======

#include <iostream>
using namespace std;



int main() {
     int n_0 =5;
     double x =3;
     double x_i[n_0] = {-0, 1, -1, 2, -2};
     double f_x[n_0] = {-5, -3, -15, 39, -9};
     double f_o[n_0][n_0];
     cout<<"enter the row size: ";
     cin>>n_0;
     for(int i=0;i<n_0;i++){
          cout<<"enter the x values : ";
          cin>>x_i[i];
     }
     for(int i=0;i<n_0;i++){
          cout<<"enter the f(x) value : ";
          cin>>f_x[i];
     }
     cout<<"for which value x the f(x) need to be calculated : ";
     cin>>x;

     // find the derivatives
     int n=1;
```

```
     for(int i=0;i<n_0;i++){
          f_o[i][0] = f_x[i];
     }
     for(int i=n_0-1;i>=0;i--){
          for(int j=0;j<i;j++){
               //cout<<"\n"<<i<<"--i "<<j<<"--j "<<n<<"--n "<<" \n";
               //cout<<"f_o[j+1][n]-"<<f_o[j+1][n];
               f_o[j][n] = (f_o[j+1][n-1]-f_o[j][n-1])/(x_i[j+1+(n-
1)]-x_i[j]);
               //cout<<f_o[j][n]<<" \n";

          }
          n++;
     }
     //PRINT THE DERIVATIVES;
     n=0;
     for(int i =0;i<n_0;i++){
          cout<<"\n";
          for(int j=1;j<n_0-i;j++){
               cout<<f_o[i][j];
               cout<<" ";
          }
     }
     //FIND THE F(X) FOR VALUE OF X
     double res=0;
          double ans=1;
          for(int i=0;i<=n_0-1;i++){
               double b=f_o[0][i];
               for(int j=0;j<i;j++){
                    ans=ans*(x-x_i[j]);
               }
               res = res+b*ans;
               ans = 1;
          }
          cout<<"\nresult-- "<<res<<endl;
}
```

SCREENSHOT





FOR VALUE OF X = 3 F(X)=241