```
#include "string.h"
#include "math.h"
#include "stdio.h"
#include "stdlib.h"
#pragma warning(disable : 4996)
double Function(double x);
double FindMax(double a, double b, double step);
double FindMin(double a, double b, double step);
char* FromDoubleToString(double x);

int main()
{
    char filename[256] = { '\0' };
    strcat(filename, "output.txt");
    char console[30][84];
    int i;
    int j;
    int countXfile;
    int countYfile;
    double valueYfile;
    double valueXfile;
    double valueXconsole;
    double valueYconsole;
    double a;
    int l;
    double b;
    double x;
    double Y;
    int countXconsole;
    int countYconsole;
    for (i = 0; i < 30; i++)
    {
    for (j = 0; j < 83; j++)
    {
        console[i][j] = ' ';
    }
    }
    for (i = 0; i < 30; i++)
    {
    console[i][83] = '\0';
    }

    for (i = 1; i < 30; i++)
    {
    console[i][41] = (char)179;
    }
    for (i = 0; i < 82; i++)
    {
    console[12][i] = (char)196;
    }
    console[12][41] = (char)197;
```

```
a = -1 * (2 * atan(1));
b = 2 * atan(1);
valueXconsole = (b - a) / 78;//цена деления
valueYconsole = (FindMax(a, b, valueXconsole)
- FindMin(a, b, valueXconsole)) / 25;
x = a;
while (x <= b)
{
Y = Function(x);
countXconsole = round(x / valueXconsole);
countYconsole = round(Y / valueYconsole);
console[12 - countYconsole][41 + countXconsole] = '*';
x += valueXconsole;

}
console[0][39] = 'y';
console[0][41] = '^';
console[12][81] = '>';
console[12][82] = 'x';
console[11][38] = '0';
for (i = 0; i < 25; i++)
{
printf("%s\n", console[i]);
}// заканчивается работа с выводом графика на экран
char file[65][110];//массив
valueXfile = (b - a) / 60;
valueYfile = (FindMax(a, b, valueXfile) - FindMin(a,
b, valueXfile)) / 80;
for (i = 0; i < 65; i++)
{
for (j = 0; j < 85; j++)
{
     file[i][j] = ' ';
}
}
for (i = 0; i < 65; i++)
{
file[i][85] = '\0';
}

for (i = 0; i < 65; i++)
{
file[i][50] = 'I';
}
```

```
x = a;
while (x <= b)
{
double Y = Function(x);
countXfile = round(x / valueXfile);
countYfile = round(Y / valueYfile);
char* s = FromDoubleToString(Y);
if (countYfile > 0)
{
     for (i = 1; i <= countYfile + 1; i++)
          file[30 - countXfile][50 + i] = '|';
     if ((50 + countYfile + strlen(s)) < 95)
     {
          int j = 0;
          for (i = countYfile + 1; i < countYfile + 1 + strlen(s);
               i++)
          {
               file[30 - countXfile][50 + i] = s[j];
               j++;
          }
     }
     else
     {
          for (i = 0; i < strlen(s); i++)
          {
               file[30 - countXfile][94 - strlen(s) + i] = s[i];
          }
     }
     file[30 - countXfile][50 + countYfile + 6] = '\0';
}

else
{
     for (i = -1; i >= countYfile - 1; i--)
          file[30 - countXfile][50 + i] = '|';
      l = (50 + countYfile - strlen(s));
     if (l > 0)
     {
          int j = 0;
          for (i = countYfile - 1; i >= countYfile - strlen(s);
               i--)
          {
               file[30 - countXfile][50 + i] = s[strlen(s)
                    - 1 - j];
               j++;
          }
     }
```

```
        else
        {
            for (i = 0; i < strlen(s); i++)
            {
                file[30 - countXfile][i] = s[i];
            }
        }

    }

    if (countXfile == 0)
    {
        for (i = 0; i < 86; i++)
        {
            file[30][i] = '-';
        }
        file[30][86] = '>';
        file[30][87] = '\0';

    }
    x += valueXfile;
    }

    file[30][50] = '+';
    FILE* on;
    on = fopen(filename, "wt");
    if (on == NULL)
    {
    printf("file not found or can't be created\n");
    return 0;
    }
    for (i = 0; i < 65; i++)
    {
    file[i][87] = '\0';
    }
    for (int i = 0; i < 65; i++)
    {
    strcat(file[i], "\n");
    if (fputs(file[i], on) == EOF)
    {
        fclose(on);
        printf("error of writing\n");
        remove(filename);
        return 0;
    }
    }
```

```
}

    char* s = FromDoubleToString(valueYfile);
    int m = strlen(s);
    char temp1[256] = { 0 };
    for (int j = 0; j < m; j++)
    {
    temp1[j] = s[j];
    }
    if (fputs(temp1, on) == EOF)
    {
    fclose(on);
    printf("error of writing\n");
    remove(filename);
    return 0;
    }
    fputs(" - Масштаб", on);
    fclose(on);
    return 0;
}

double Function(double x)

{
    return 2 * sin(x) + 3 * cos(2 * x);
}

double FindMax(double a, double b, double step)
{
    double max;
    max = Function(a);
    while (a <= b)
    {
    a += step;
    if (Function(a) > max)
        max = Function(a);
    }
    return max;
}

double FindMin(double a, double b, double step)
{
    double min;
     min = Function(a);
    while (a <= b)
    {
    a += step;
    if (Function(a) < min)
        min = Function(a);
    }
    return min;
}
```

```c
char* FromDoubleToString(double x)
{
    char s[10];
    int i = 0;
    int count = 0;
    int n;
    int j = 0;
    int l;
    double r;
    if (x < 0)
    {
    s[0] = '-';
    i++;
    x = fabs(x);
    }
     n = x;
     r = x - n;
    while (n > 0)
    {
    l = fmod(n, 10);
    s[sizeof(s) - count - 1] = (char)l + 48;
    count++;
    n /= 10;
    }
    for (int j = count; j > 0; j--)
    {
    s[i] = s[sizeof(s) - j];
    i++;
    }
    if (x < 1)
    {
    s[i] = '0';
    i++;
    }
    if (r != 0)
    {
    s[i] = '.';
    i++;
    for ( j = 0; j < 3; j++)
    {
        int a = r * 10;
        s[i] = (char)a + 48;
        r = r * 10 - a;
        i++;
    }
    }
    s[i] = '\0';
    return s;
}
```