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Вычмат, 5 лаба

12 вариант

```
1. #include <iostream>
2. #include <cmath>
3. using namespace std;
4. //4 вариант
5. float f1(float x)
6. {
7.     return 1 / sqrt(x * x - 1);
8. }
9.
10. float f2(float x)
11. {
12.     return (log(x*x + 7) / (x*x - 1));
13. }
14.
15. //метод трапеций
16. float trap(float a, float b)
17. {
18.     float x, w = 0;
19.
20.     int n = 8;
21.
22.     double result1, result2, p, h;
23.
24.     p = 0.001; //точность
25.
26.     //метод трапеций
27.     while (true)
28.     {
29.         h = (b - a) / n;
30.         for (int k = 1; k < n; k++)
31.         {
32.             x = a + k * h;
33.             w = w + f1(x);
34.         }
35.         w = (2 * w + f1(a) + f1(b)) * (h / 2);
36.         return w;
37.
38.         n++;
39.
40.         h = (b - a) / n;
41.         for (int k = 1; k < n; k++)
42.         {
43.             x = a + k * h;
44.             w = w + f1(x);
```

```

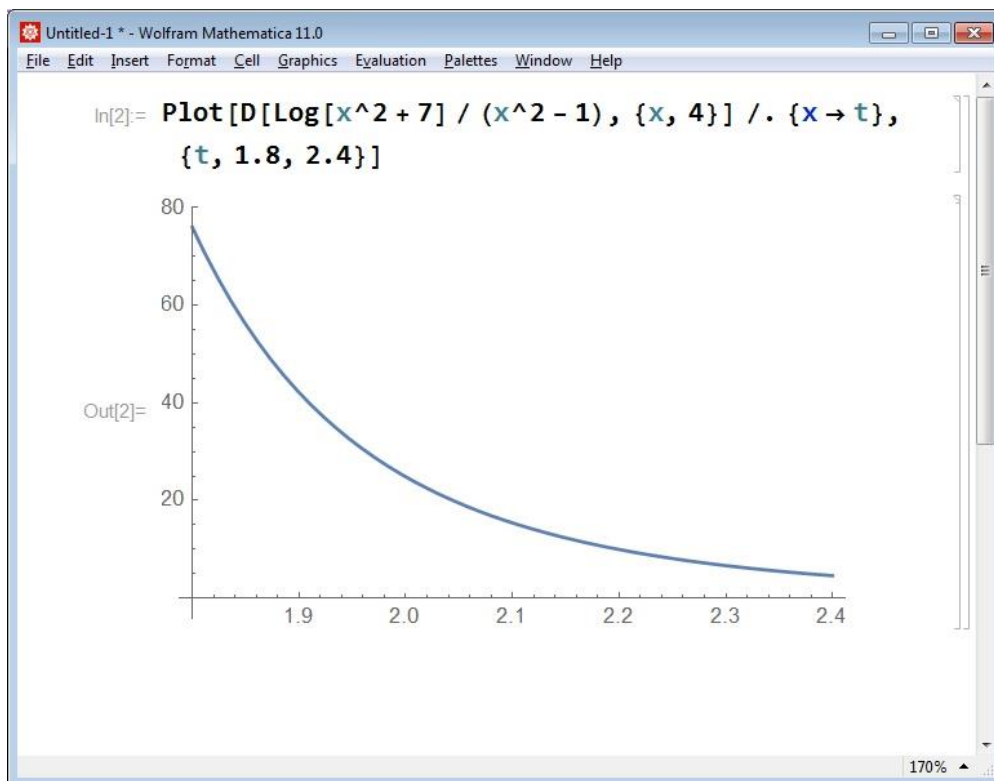
45.         }
46.         w = (2 * w + f1(a) + f1(b)) * (h / 2);
47.         return w;
48.
49.         //если достигли заданной точности
50.         if (abs(result2 - result1) < p)
51.         {
52.             break;
53.         }
54.         n++;
55.     }
56.
57.     return result2;
58.
59. }
60.
61. double pogr()
62. {
63.     int n = 8;
64.     return 80 * 1 / (180 * pow(n, 4));
65. }
66.
67. //метод Симпсона
68. float simp(float a, float b)
69. {
70.     int m = 4;
71.
72.     int n = 2 * m;
73.
74.     double s1 = 0, s2 = 0;
75.
76.     double h = (b - a) / n;
77.
78.     double s;
79.
80.     double x;
81.
82.     for (int k = 1; k <= m; k++)
83.     {
84.         x = a + (2 * k - 1) * h;
85.         s1 = s1 + f2(x);
86.     }
87.     for (int k = 1; k < m; k++)
88.     {
89.         x = a + 2 * k * h;
90.         s2 = s2 + f2(x);
91.     }
92.     s = (4 * s1 + 2 * s2 + f2(a) + f2(b)) * h / 3;
93.
94.     return s;

```

```

95.     }
96.
97.     int main()
98.     {
99.         double a = 2.3, b = 3.3;
100.        cout << "Trapeciya: " << trap(a, b) << endl << endl;
101.
102.
103.        a = 1.8, b = 2.4;
104.        cout << "Simpson: " << simp(a, b) << endl << endl;
105.
106.        cout << "Pogreshnost: " << pogr() << endl;
107.    }

```



The image shows a screenshot of the Microsoft Visual Studio debug console. The title bar reads "Консоль отладки Microsoft Visual Studio". The output text is as follows:

```

Trapeciya: 0.388433
Simpson: 0.442456
Pogreshnost: 0.000108507

```