Типовой расчет

```
In[*]:= dotes = {{-0.2, 0.0398739}, {-0.124, 0.0151449}, {-0.048, 0.00232526},
        {0.028, 0.000775957}, {0.104, 0.010885}, {0.18, 0.0317362},
        {0.256, 0.0647997}, {0.332, 0.105358}, {0.408, 0.159633}, {0.484, 0.215989},
        {0.56, 0.288732}, {0.636, 0.356672}, {0.712, 0.444944}, {0.788, 0.520637},
        {0.864, 0.621813}, {0.94, 0.702119}, {1.016, 0.814088}, {1.092, 0.89659},
        {1.168, 1.01775}, {1.244, 1.10065}, {1.32, 1.22983}, {1.396, 1.31182},
        {1.472, 1.44816}, {1.548, 1.52829}, {1.624, 1.67119}, {1.7, 1.74876}}
```

```
Out[*]=
        {{-0.2, 0.0398739}, {-0.124, 0.0151449}, {-0.048, 0.00232526},
         {0.028, 0.000775957}, {0.104, 0.010885}, {0.18, 0.0317362},
         {0.256, 0.0647997}, {0.332, 0.105358}, {0.408, 0.159633}, {0.484, 0.215989},
         {0.56, 0.288732}, {0.636, 0.356672}, {0.712, 0.444944}, {0.788, 0.520637},
         {0.864, 0.621813}, {0.94, 0.702119}, {1.016, 0.814088}, {1.092, 0.89659},
         {1.168, 1.01775}, {1.244, 1.10065}, {1.32, 1.22983}, {1.396, 1.31182},
         {1.472, 1.44816}, {1.548, 1.52829}, {1.624, 1.67119}, {1.7, 1.74876}}
```

```
In[*]:= resul = {};
        n = 2;
        For[i = 1, i < Length[dotes] + 1, i = i + n,
         resul = Append[resul, {dotes[[i, 1]], dotes[[i, 2]]}];]
        Length[resul]


        values = Table[{resul[[i, 1]], resul[[i, 2]]}, {i, 1, Length[resul]}];


        TableForm[values, TableHeadings → {None, {"x", "y"}}]
```

```
Out[*]=
        13
```

Out[*]//TableForm=

x	y
-0.2	0.0398739
-0.048	0.00232526
0.104	0.010885
0.256	0.0647997
0.408	0.159633
0.56	0.288732
0.712	0.444944
0.864	0.621813
1.016	0.814088
1.168	1.01775
1.32	1.22983
1.472	1.44816
1.624	1.67119

```
In[*]:= a = -0.2;
        b = 1.7;
        h = 0.076;
```

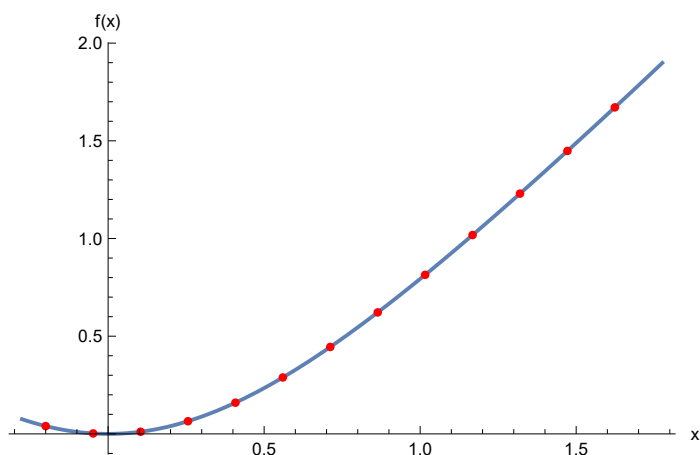*In[ ]:=* **term = InterpolatingPolynomial[values, x];**
f[x_] = term

Out[ ]=

1.67119 +
(−1.624 + x) (0.894362 + (0.2 + x) (0.493647 + (−0.712 + x) (−0.21912 + (−1.168 + x)
(0.0375011 + (−0.104 + x) (0.0217917 + (−1.472 + x) (−0.0409073 +
(−0.408 + x) (0.0039891 + (0.00986424 + (−0.011024 + (0.00408728 +
(0.00500716 + 0.000106787 (−1.016 + x)) (−0.256 + x))
(−0.864 + x)) (−1.32 + x)) (0.048 + x))))))))

In[ ]:=

Show[Plot[f[x], {x, a − h, b + h}, AxesLabel → {"x", "f(x)"}],
 ListPlot[values, PlotStyle → Red]]

Out[ ]=

In[ ]:= **Print["f[-0.2 - h], f[1.7 + h]"]**
Print[f[-0.2 - h]]
Print[f[1.7 + h]]

f[-0.2 - h], f[1.7 + h]

0.0751388
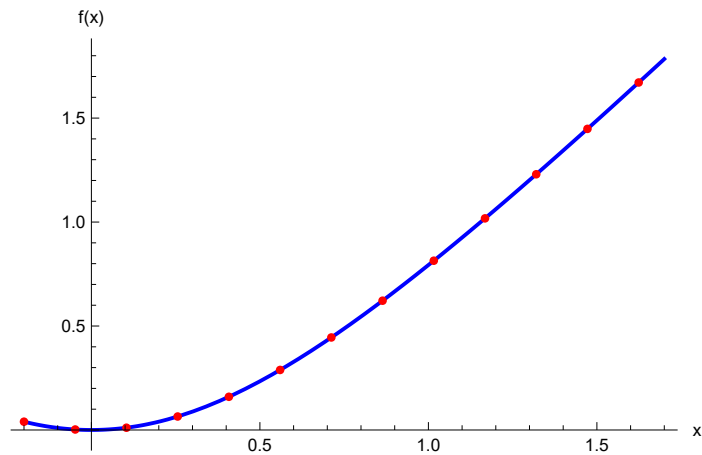

1.89864

```
In[ ]:= res2 = Interpolation[values, x, Method → "Spline"];
       Collect[res2, x];
       Show[Plot[{res2}, {x, a, b}, AxesLabel → {"x", "f(x)"}, PlotStyle → Blue],
        ListPlot[values, PlotStyle → Red]]
```

Out[ ]=

Интегрирование

```
In[ ]:= a = values[[1, 1]]
       b = values[[Length[values], 1]]
       n = 200;
       h = (Abs[a] + Abs[b]) / n;
       len = Length[values]
       f[x_] = f[x];
       int = NIntegrate[f[x], {x, a, b}]
```

Out[ ]=

-0.2

Out[ ]=

1.624

Out[ ]=

13

Out[ ]=

1.05408

Левые прямоугольники

```
In[ ]:= intl = h * Sum[f[a + i * h], {i, 0, n - 1}]
       Print["Pogreshnost"]
       Abs[int - intl]
```

Out[ ]=

1.04665

Pogreshnost

Out[ ]=

0.00742581

Правые прямоугольники

In[ ]:=
```
intr = h * Sum[f[a + i * h], {i, 1, n}]
Print["Pogreshnost"]
Abs[int - intr]
```

Out[ ]=
1.06153

Pogreshnost

Out[ ]=
0.00745179

Средние прямоугольки

In[ ]:=
```
intm = h * Sum[f[a + (i) * h + h / 2], {i, 1, n - 1}]
Print["Pogreshnost"]
Abs[int - intm]
```

Out[ ]=
1.05373

Pogreshnost

Out[ ]=
0.000353945

Метод трапеций

In[ ]:=
```
intt = h / 2 * Sum[f[a + i * h] + f[a + (i + 1) * h], {i, 0, n}] // N
Print["Pogreshnost"]
Abs[int - intt]
```

Out[ ]=
1.0694

Pogreshnost

Out[ ]=
0.0153159