

«

»

2

1 31 2005 .

2005

681.31:001.8

»
2a / . . . ,- : , 2005. – 28 . -

« »
.

:
· · , · ,
· · , ·

· · , ·

(.1).

1 -

	1	2	3	4	5
00	1.1	2.1	3.3	1	1
01	1.2	2.2	3.4	2	2
02	1.3	2.3	3.5	3	3
03	1.4	2.4	3.6	4	4
04	1.5	2.5	3.7	5	5
05	1.6	2.6	3.8	6	6
06	1.7	2.7	3.9	7	7
07	1.8	2.8	3.10	8	8
08	1.9	2.9	3.11	9	9
09	1.10	2.10	3.12	10	10
10	1.11	2.11	3.13	11	11
11	1.12	2.12	3.14	12	12
12	1.13	2.13	3.15	13	13
13	1.14	2.14	3.16	14	14
14	1.15	2.15	3.17	15	15
15	1.16	2.16	3.18	16	16
16	1.17	2.17	3.6	17	17
17	1.18	2.18	3.7	18	18
18	1.1	2.2	3.8	19	19
19	1.2	2.3	3.9	20	20
20	1.3	2.4	3.10	21	21
21	1.4	2.5	3.11	22	22
22	1.5	2.6	3.12	23	23
23	1.6	2.7	3.13	24	24
24	1.7	2.8	3.14	25	25
25	1.8	2.9	3.15	26	1
26	1.9	2.10	3.16	27	2
27	1.10	2.11	3.17	28	3
28	1.11	2.12	3.18	29	4
29	1.12	2.13	3.9	30	5
30	1.13	2.14	3.10	31	6
31	1.14	2.15	3.11	32	7
32	1.15	2.16	3.12	32	8
33	1.16	2.17	3.13	31	9
34	1.17	2.18	3.14	30	10
35	1.18	2.3	3.15	29	11
36	1.1	2.4	3.16	28	12
37	1.2	2.5	3.17	27	13
38	1.3	2.6	3.18	26	14
39	1.4	2.7	3.12	25	15
40	1.5	2.8	3.13	24	16
41	1.6	2.9	3.14	23	17

-	1	2	3	4	5
42	1.7	2.10	3.15	22	18
43	1.8	2.11	3.16	21	19
44	1.9	2.12	3.17	20	20
45	1.10	2.13	3.18	19	21
46	1.11	2.14	3.15	18	22
47	1.12	2.15	3.16	17	23
48	1.13	2.16	3.17	16	24
49	1.14	2.17	3.18	15	25
50	1.15	2.18	3.1	14	1
51	1.16	2.4	3.2	13	2
52	1.17	2.5	3.3	12	3
53	1.18	2.6	3.4	11	4
54	1.1	2.7	3.5	10	5
55	1.2	2.8	3.6	9	6
56	1.3	2.9	3.7	8	7
57	1.4	2.10	3.8	7	8
58	1.5	2.11	3.9	6	9
59	1.6	2.12	3.10	5	10
60	1.7	2.13	3.11	4	11
61	1.8	2.14	3.12	3	12
62	1.9	2.15	3.13	2	13
63	1.10	2.16	3.14	1	14
64	1.11	2.17	3.15	2	15
65	1.12	2.18	3.16	3	16
66	1.13	2.5	3.17	4	17
67	1.14	2.6	3.18	5	18
68	1.15	2.7	3.1	6	19
69	1.16	2.8	3.2	7	20
70	1.17	2.9	3.4	8	21
71	1.18	2.10	3.5	9	22
72	1.1	2.11	3.7	10	23
73	1.2	2.12	3.8	11	24
74	1.3	2.13	3.10	12	25
75	1.4	2.14	3.11	13	1
76	1.5	2.15	3.13	14	2
77	1.6	2.16	3.14	15	3
78	1.7	2.17	3.1	16	4
79	1.8	2.18	3.2	17	5
80	1.9	2.6	3.3	18	6
81	1.10	2.7	3.4	19	7
82	1.11	2.8	3.5	20	8
83	1.12	2.9	3.6	21	9
84	1.13	2.10	3.7	22	10
85	1.14	2.11	3.8	23	11
86	1.15	2.12	3.9	24	12

-	1	2	3	4	5
87	1.16	2.13	3.10	25	13
88	1.17	2.14	3.11	26	14
89	1.18	2.15	3.12	27	15
90	1.1	2.16	3.13	28	16
91	1.2	2.17	3.14	29	17
92	1.3	2.18	3.15	30	18
93	1.4	2.2	3.16	31	19
94	1.5	2.1	3.17	32	20
95	1.6	2.5	3.18	32	21
96	1.7	2.4	3.2	31	22
97	1.8	2.3	3.1	30	23
98	1.9	2.1	3.4	29	24
99	1.10	2.2	3.5	28	25

1

4,

2

1-4

5

-

Word for Windows.

3

1-3 – 1 2

(-

) – 12.

4

5-

5

-

« ».

-

I.

Windows.

1.1

1.2

1.3

1.4

Windows.

1.5

1.6

(Windows Explorer).

- 1.7
- 1.8
- 1.9 Windows.
- 1.10
- 1.11 « ».
- 1.12 Windows.
- 1.13 Windows.
- 1.14 , .
- 1.15 Windows.
- 1.16
- 1.17 Windows: , .
- 1.18

2. :

Word for Windows.

- 2.1 Word.
- 2.2
- 2.3 Word.
- 2.4
- 2.5
- 2.6
- 2.7
- 2.8
- 2.9
- 2.10
- 2.11
- 2.12 Word.
- 2.13
- 2.14
- 2.15 « ».
- 2.16 , .
- 2.17
- 2.18

3. :

Excel.

- 3.1
- 3.2
- 3.3
- 3.4
- 3.5
- 3.6

- 3.7 .
 3.8 « ».
 3.9 .
 3.10 .
 3.11 .
 3.12 « ».
 3.13 .
 3.14 .
 3.15 « ».
 3.16 .
 3.17 .
 3.18 .

4.

Word

Microsoft Equation 3.0,

:

1	$\frac{2}{3} \operatorname{arctg} \frac{5 \operatorname{tg} \frac{x}{2} + 4}{3}$ $\ln(2 + \cos x) + \frac{4}{\sqrt{3}} \operatorname{arctg} \left(\frac{1}{\sqrt{3}} \operatorname{tg} \frac{x}{2} \right)$ $\frac{\cos x (\cos x - \sin x)}{4} - \frac{1}{4} \ln \cos x - \sin x $ $\frac{4}{25} x - \frac{3}{25} \ln \operatorname{tg} x + 2 + \frac{2}{5(\operatorname{tg} x + 2)} - \frac{3}{25} \ln \cos x $ $\frac{\cos 2x - 15}{15(4 + \sin 2x)} + \frac{4}{15\sqrt{15}} \operatorname{arcsin} \frac{4 \sin 2x + 1}{4 + \sin 2x}$	2	$\frac{1}{2} (\operatorname{tg}^2 x - \operatorname{ctg}^2 x) + 2 \ln \operatorname{tg} x $ $\frac{3}{5} e^x [(x^x - 1) \cos x + (x - 1)^2 \sin x]$ $\frac{3}{8} \operatorname{arctg} x - \frac{x}{4(x^4 - 1)} - \frac{3}{16} \ln \left \frac{x - 1}{x + 1} \right $ $\frac{2}{3} \ln \left \frac{x^3 + 1}{x^3} \right - \frac{1}{3x^3} - \frac{1}{3(x^3 + 1)}$ $\ln(\sqrt[3]{x^2 + 1} - 1) - \frac{1}{4} \ln \left[\sqrt[3]{(x^2 + 1)^2} + \sqrt[3]{x^2 + 1} + 1 \right]$
3	$\frac{1}{2} \operatorname{tg} x + \frac{2}{2\sqrt{2}} \operatorname{arctg}(\sqrt{2} \operatorname{tg} x)$ $\ln \left \frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right + 2 \operatorname{arctg} \sqrt{\frac{1-x}{1+x}}$ $\ln \frac{x}{(1 + \sqrt[10]{x})^{10}} + \frac{10}{\sqrt[10]{x}} - \frac{5}{\sqrt[5]{x}} + \frac{10}{3\sqrt[10]{x^3}} - \frac{5}{2\sqrt[5]{x^2}}$ $\frac{5}{16} x + \frac{1}{12} \sin 2x \left(\cos^4 x + \frac{5}{4} \cos^2 x + \frac{15}{8} \right)$ $\operatorname{arctg} \frac{\operatorname{tg} x}{\sqrt{2 + \operatorname{tg}^2 x}} + \ln(\sqrt{2 + \operatorname{tg}^2 x} + \operatorname{tg} x)$	6	$\frac{1}{2} \operatorname{ctg} \frac{x}{2} - \frac{1}{6} \operatorname{ctg}^3 \frac{x}{2}$ $\operatorname{arctg} \sqrt{x^2 - 1} - \frac{\ln x}{\sqrt{x^2 - 1}}$ $3e^{\sqrt[3]{x}} (\sqrt[3]{x^2} - 2\sqrt[3]{x} + 2)$ $\frac{1}{4} (\operatorname{tg}^4 x - \operatorname{ctg}^4 x) + 2(\operatorname{tg}^2 x - \operatorname{ctg}^2 x) + 6 \ln \operatorname{tg} x $ $\frac{57x^4 + 103x^2 + 32}{8x(x^2 + 1)^2} - \frac{57}{8} \operatorname{arctg}(x)$

4	$\frac{1}{15} \cos^3 x (3 \cos^2 x - 5)$ $\frac{(tg^2 x - 1)(tg^4 x + 10tg^2 x + 1)}{3tg^3 x}$ $3e^{\sqrt[3]{x}}(\sqrt[3]{x^5} - 5\sqrt[3]{x^4} + 20x - 60\sqrt[3]{x^2} + 120\sqrt[3]{x} - 120)$ $\frac{1}{4\sqrt{2}} \ln \frac{x^2 + x\sqrt{2} + 1}{x^2 - x\sqrt{2} + 1} + \frac{\sqrt{2}}{4} \operatorname{arctg} \frac{x\sqrt{2}}{1 - x^2}$ $\frac{2 - x}{4(x^2 + 2)} + \frac{\ln(x^2 + 2)}{2} - \frac{1}{4\sqrt{2}} \operatorname{arctg} \frac{x}{\sqrt{2}}$	7	$tgx + \frac{1}{4} \sin 2x - \frac{3}{2} x$ $\frac{1}{4} tg^4 x - \frac{1}{2} tg^2 x - \ln \cos x $ $\ln \frac{x^2 + 1 + \sqrt{x^4 + 3x^2 + 1}}{x}$ $\ln \left \frac{1 - \sqrt{1 - x^2}}{x} \right - \frac{\arcsin x}{x}$ $\frac{2}{3} x\sqrt{x} + \frac{24}{11} x\sqrt[6]{x^5} + \frac{36}{13} x^2 \sqrt[6]{x} + \frac{8}{5} x^2 \sqrt{x}$
5	$\frac{1}{3\cos^3 x} - \frac{1}{\cos x}$ $\frac{1}{8} \operatorname{arctg}(x+1) - \frac{5x^3 + 15x^2 + 18x + 8}{8(x^2 + 2x + 2)^2}$ $2\sqrt{x+1}[\ln x+1 - 2]$ $\ln \frac{x^2 + 4}{\sqrt{x^2 + 2}} + \frac{3}{2} \operatorname{arctg} \frac{x}{2} - \frac{3\sqrt{2}}{2} \operatorname{arctg} \frac{x\sqrt{2}}{2}$ $\frac{x}{216(x^2 + 9)} + \frac{x}{36(x^2 + 9)^2} + \frac{1}{648} \operatorname{arctg} \frac{x}{3}$	8	$\ln tgx - \frac{1}{2 \sin^2 x}$ $- \frac{4\sqrt{2}}{5} \sqrt{ctg^5 x}$ $\ln \frac{ u^2 - 1 }{\sqrt{u^4 + u^2 + 1}} + \sqrt{3} \operatorname{arctg} \frac{1 + 2u^2}{\sqrt{3}}$ $6\sqrt[3]{(1+x)^2} \left[\frac{(1+x)^2}{16} - \frac{1+x}{5} + \frac{\sqrt{1+x}}{7} + \frac{1}{4} \right]$ $3 \left[\ln \left \frac{\sqrt[3]{x}}{1 + \sqrt[3]{x}} \right + \frac{2\sqrt[3]{x} + 3}{2(1 + \sqrt[3]{x})^2} \right]$
9	$\frac{2}{3} \frac{tg^2 x - 3}{\sqrt{tgx}}$ $\frac{13x - 159}{8(x^2 - 6x + 13)} + \frac{53}{16} \operatorname{arctg} \frac{x - 3}{2}$ $\frac{3}{8} \operatorname{arctg}(x+1) + \frac{x+1}{x^2 + 2x + 2} + \frac{x}{4(x^2 + 2x + 2)^2}$ $\frac{1}{16} \ln x - \frac{1}{18} \ln(x^2 + 1) + \frac{7}{288} \ln(x^2 + 4) - \frac{1}{24(x^2 + 4)}$ $\ln \frac{ \sqrt[3]{tgx - 1} }{\sqrt[6]{tg^2 x + tgx + 1}} - \frac{\sqrt{3}}{3} \operatorname{arctg} \frac{2tgx + 1}{\sqrt{3}}$	12	$\frac{1}{2} (x-1)\sqrt{x^2 - 2x - 1} - \ln x - 1 + \sqrt{x^2 - 2x - 1} $ $\ln \frac{\sqrt{(x^2 - 2x + 5)^3}}{ x-1 } + \frac{1}{2} \operatorname{arctg} \frac{x-1}{2}$ $\frac{\sqrt{3}}{2} \operatorname{arctg} \frac{2\sqrt[3]{x^2 + 1} + 1}{\sqrt{3}}$ $\frac{1}{6} \ln \frac{(x+1)^2}{x^2 - x + 1} + \frac{1}{\sqrt{3}} \operatorname{arctg} \frac{2x-1}{\sqrt{3}}$ $\frac{4}{\sqrt{\cos \frac{x}{2}}} + 2 \operatorname{arctg} \sqrt{\cos \frac{x}{2}} - \ln \frac{1 + \sqrt{\cos \frac{x}{2}}}{1 - \sqrt{\cos \frac{x}{2}}}$

10	$\frac{x^2 e^{x^2}}{2}$ $\frac{1}{4} \ln \left \frac{1+x}{1-x} \right + \frac{1}{2} \operatorname{arctg} x$ $\frac{1}{648} \left[\operatorname{arctg} \frac{x+1}{3} + \frac{3(x+1)}{x^2+2x+10} + \frac{18(x+1)}{(x^2+2x+10)^2} \right]$ $\frac{3-7x-2x^2}{2(x^3-x^2-x+1)} + \ln \frac{ x-1 }{(x+1)^2}$ $\left(-\frac{1}{2}x^4 + \frac{5}{4}x^2 - \frac{3}{5} \right) + \frac{1}{8\sqrt{6}} \ln \left \frac{\sqrt{3+x\sqrt{2}}}{\sqrt{3-x\sqrt{2}}} \right $	13	$\ln \frac{ x+1 }{\sqrt{2x+1}}$ $\frac{x^2}{2} - 2x - \frac{2}{x} + 2 \ln(x^2+2x+2) - 2 \operatorname{arctg}(x+1)$ $\frac{(x+1)^2}{2} + \ln \frac{ x-1 }{\sqrt{x^2+1}} - \operatorname{arctg} x$ $\frac{1}{4} \left[\ln \frac{\sqrt{x^2+1}}{ x+1 } + \operatorname{arctg} x - \frac{7}{(x-1)^2} \right]$ $\frac{1}{4} \left(\frac{2x^6-3x^2}{x^4-1} + \frac{3}{2} \ln \left \frac{x^2-1}{x^2+1} \right \right)$
11	$x \ln(x + \sqrt{1+x^2}) - \sqrt{1+x^2}$ $\frac{1}{4} \ln \left \frac{1+x}{1-x} \right - \frac{1}{2} \operatorname{arctg} x$ $\frac{1}{\sqrt{2}} \ln(\sqrt{2} \operatorname{tg} x + \sqrt{1+2\operatorname{tg}^2 x})$ $\frac{1}{4} \ln \frac{x^4}{(x+1)^2(x^2+1)} - \frac{1}{2} \operatorname{arctg} x$ $\frac{x^2}{2} + \ln \left \frac{x(x-2)\sqrt{(x-1)(x+1)^3}}{x+2} \right $	14	$4 \ln x - 3 \ln x-1 - \frac{9}{x-1}$ $\operatorname{arctg} \sqrt{x^2-1} - \frac{\ln x}{\sqrt{x^2-1}}$ $ x+1 - \frac{1}{4} \ln(x^2+1) - \frac{1}{2(x+1)}$ $\frac{1}{3} \ln \frac{ x-1 }{\sqrt{x^2+x+1}} + \frac{1}{\sqrt{3}} \operatorname{arctg} \frac{2x+1}{\sqrt{3}}$ $\frac{1}{2\sqrt{2}} \ln \left \frac{x-\sqrt{2}}{x+\sqrt{2}} \right + \frac{1}{2\sqrt{3}} \ln \left \frac{x-\sqrt{3}}{x+\sqrt{3}} \right $
15	$x + \frac{1}{x} + \ln \frac{(x-1)^2}{ x }$ $-\frac{1}{3(x-2)^3} + \frac{1}{2(x-2)^2} + \ln x-2 $ $-\frac{1}{2} \left[\operatorname{ctg} x + \frac{1}{\sqrt{2}} \operatorname{arctg} \left(\frac{\operatorname{tg} x}{\sqrt{2}} \right) \right]$ $-\frac{1}{3} \operatorname{tg} x (2 + \operatorname{tg}^2 x) \sqrt{4 - \operatorname{ctg}^2 x}$ $2 \ln \left \frac{x+4}{x+2} - \frac{5x+12}{x^2+6x+8} \right $	18	$\ln \left \frac{x^2}{x+1} \right + \frac{6}{x+1}$ $\frac{\sqrt{x^2+2x-3}}{8(x+1)^2} + \frac{1}{16} \arccos \frac{2}{x+1}$ $\frac{1}{2} e^x [(x^2-1)\cos x + (x-1)^2 \sin x]$ $\operatorname{arctg} \frac{\operatorname{tg} x}{\sqrt{2+\operatorname{tg}^2 x}} + \ln(\sqrt{2+\operatorname{tg}^2 x} + \operatorname{tg} x)$ $\frac{1}{2} \sqrt{2x^2+3x} - \frac{3}{4\sqrt{2}} \ln \left(x + \frac{3}{4} + \sqrt{x^2 + \frac{3x}{2}} \right)$

16	$\arctg x + \frac{1}{x} - \frac{1}{3x^3}$ $-\frac{1}{2}(3x-19)\sqrt{3-2x-x^2} + 14\arcsin\frac{x+1}{2}$ $\frac{1}{\sqrt{2}}\left[\ln(\sin x + \sqrt{\sin 2x}) + \arcsin(\sin x - \cos x)\right]$ $\left(\frac{1}{2}x^2 - \frac{5}{6}x + \frac{1}{6}\right)\sqrt{x^2+2} + \ln(x + \sqrt{x^2+2x+2})$ $\frac{1}{2\sqrt{2}}\ln\frac{\sqrt{2+2x^2}-x}{\sqrt{2+2x^2}+x} + \ln(x + \sqrt{x^2+1})$	19	$\arcsin e^x - \sqrt{1-e^{2x}}$ $\frac{1}{4}(tg^4 x - ctg^4 x) + 2(tg^2 x - ctg^2 x) + 6\ln tg x $ $\ln\frac{x^2+1+\sqrt{x^2+3x^2+1}}{x}$ $\frac{x-1}{2(x^2+1)} - \frac{1}{2}\ln x+1 + \frac{1}{4}\ln(1+x^2)$ $\frac{x}{x^2+x+1} + \frac{2}{\sqrt{3}}\arctg\frac{2x+1}{\sqrt{3}} - 2\ln(x^2+x+1)$
17	$\frac{2tg^2 x - 3}{3\sqrt{tg x}}$ $\frac{1}{x} + \frac{1}{2}\ln\left \frac{x-1}{x+1}\right $ $\frac{3x^2-x}{(x-1)(x^2+1)} + \ln\frac{(x-1)^2}{x^2+1} + \arctg x$ $\frac{1}{15}\left[\frac{1}{2}\ln\frac{(z-1)^2}{z^2+z+1} - \sqrt{3}\arctg\frac{2z+1}{\sqrt{3}}\right]$ $\frac{1}{6}\ln\frac{u^2+u+1}{(u-1)^2} - \frac{1}{\sqrt{3}}\arctg\frac{2u+1}{\sqrt{3}}$	20	$2\sqrt{e^x-1} - 2\arctg\sqrt{e^x-1}$ $\frac{x^3}{3} + \frac{x^2}{2} + 4x + \ln\left \frac{x^2(x-2)^5}{(x+2)^3}\right $ $\frac{61}{16}\ln 8x+9+4\sqrt{4x^2+9x+1} - \frac{5}{4}\sqrt{4x^2+9x}$ $\ln(x + \sqrt{1+x^2}) - \frac{\sqrt{(1+x^2)^5}}{5x^5} - \frac{\sqrt{(1+x^2)^3}}{3x^3}$ $\frac{1}{3}\sqrt{3x^2-11x+2} + \frac{11}{6\sqrt{3}}\ln\left x - \frac{11}{6} + \sqrt{x^2 - \frac{11}{3}x + \frac{2}{3}}\right $
21	$\frac{3x^2}{x^3+2y^3-z^3}$ $\frac{1}{x^2(x^2+1)} + \ln\sqrt{x^2+1}$ $-\frac{1}{4}\ln\left tg\frac{x}{2}\right + \frac{1}{8\sin^2\frac{x}{2}}$ $\frac{1}{4}\ln\left \frac{1+tg x}{1-tg x}\right + \frac{1}{2}\sin x \cos x$ $\frac{1}{8}\sqrt[8]{(1+x^3)^8} - \frac{1}{5}\sqrt[3]{(1+x^3)^5}$	24	$\sqrt{(a-x)(x-b)} - (a-b)\arctg\sqrt{\frac{a-x}{x-b}}$ $x\arctg x - \frac{1}{2}\ln(1+x^2)$ $\frac{1}{5}\sqrt{(x^2-a^2)^5} - \frac{a^2}{3}\sqrt{(x^2-a^2)^3}$ $\frac{1}{8(x-1)^8} - \frac{1}{3(x-1)^9} - \frac{3}{10(x-1)^{10}} - \frac{1}{11(x-1)^{11}}$ $\frac{\sqrt{2x+1}}{x} + \ln\left \frac{\sqrt{2x+1}-1}{\sqrt{2x+1}+1}\right $

22	$\frac{1}{3} \operatorname{tg} \left(\frac{\pi}{4} + \frac{3x}{2} \right)$ $-\frac{1}{2} \ln(x+1) + \frac{\sqrt{3}}{2} \operatorname{arctg} \frac{2x-1}{\sqrt{3}}$ $\frac{1}{2} x^2 \ln(1+x^3) - \frac{3}{4} x^2 + \frac{1}{4} \ln(x^2-x+1)$ $\frac{3}{11} \ln 3x+1 + \frac{2}{33} \ln 2x-3 - \frac{1}{3} \ln x $ $6 \ln \left \frac{x-1}{x} \right - \frac{12x^2-5x-1}{2(x^3-x^2)}$	25	$\frac{1}{2} e^{-x^2} (x^4 + 2x^2 + 2)$ $\frac{1}{2} \ln \left \operatorname{tg} \left(\frac{\varphi}{2} + \frac{\pi}{6} \right) \right $ $\frac{2}{b^2 \sin 2\alpha} \ln \left \frac{\sin(\alpha-x)}{\sin-(\alpha+x)} \right $ $x \arccos \sqrt{\frac{x}{x+1}} + \sqrt{x} - \operatorname{arctg} \sqrt{x}$ $\frac{3}{55} \sqrt[3]{\operatorname{tg}^5 x (5 \operatorname{tg}^2 x + 11)}$
23	$a^4 \sqrt{x^2 - a^2} + a^5 \arcsin \frac{a}{ x }$ $\frac{\sqrt{(4+x^2)^3(x^2-6)}}{120x^5}$ $\frac{1}{7} \operatorname{ctg}^7 x + \frac{1}{5} \operatorname{ctg}^5 x - \frac{1}{3} \operatorname{ctg}^3 x + \operatorname{ctg} x$ $-\frac{1}{\sqrt{2}} \ln \left \frac{\sqrt{2+x-x^2} + \sqrt{2}}{x} + \frac{1}{2\sqrt{2}} \right $ $\frac{1}{10} \sqrt{\left(\frac{1+x^4}{x^4} \right)^5} + \frac{1}{3} \sqrt{\left(\frac{1+x^4}{x^4} \right)^3} - \frac{1}{2}$	26	$\frac{1}{2} \arcsin x - \frac{x+2}{2} \sqrt{1-x^2}$ $\frac{1}{3} \left[x^3 + \sqrt{(x^2-1)^3} \right]$ $\frac{1}{\sqrt{15}} \ln \left \frac{x+6+\sqrt{60x-15x^2}}{2x-3} \right $ $\frac{1}{8\sqrt{3}} \ln \left \sqrt{3x^2-3x+1} + \frac{\sqrt{3}}{2} (2x-1) \right $ $\frac{1}{4} \ln \frac{\sqrt{1-x^4}+1}{x^2} - \frac{1}{4} \frac{\sqrt{1-x^4}}{x^4}$
27	$\frac{6y^2}{x^3+2y^3-z^3}$ $\frac{\sqrt{2}}{2} \ln \left \operatorname{tg} \left(\frac{\pi}{8} + \frac{x}{2} \right) \right $ $\frac{1}{\sqrt{a^2+b^2}} \ln \left \operatorname{tg} \frac{x + \operatorname{arctg} \frac{a}{b}}{2} \right $ $\frac{y \left[\left(1 + \operatorname{arctg}^2 \frac{y}{x} \right)^2 + 2 \operatorname{arctg}^3 \frac{y}{x} \right]}{(x^2+y^2) \left(1 + \operatorname{arctg}^2 \frac{y}{x} \right) \left(1 + \operatorname{arctg} x \frac{y}{x} \right)^2}$ $\frac{1}{4} \ln \frac{\sqrt[4]{1+x^4}+x}{\sqrt[4]{1+x^4}-x} - \frac{1}{2} \operatorname{arctg} \frac{\sqrt[4]{1+x^4}}{x}$	30	$-15 \ln(x+2+\sqrt{x^2+4x+5})$ $\frac{1}{3} \left(\ln \left \operatorname{tg} \frac{3x}{2} \right + \cos 3x \right)$ $\frac{1}{5} \ln \frac{ u-1 }{\sqrt{u^2+u+1}} + \frac{\sqrt{3}}{5} \operatorname{arctg} \frac{1+2u}{\sqrt{3}}$ $\frac{x \left[\left(1 + \operatorname{arctg}^2 \frac{y}{x} \right)^2 + 2 \operatorname{arctg}^3 \frac{y}{x} \right]}{(x^2+y^2) \left(1 + \operatorname{arctg}^2 \frac{y}{x} \right) \left(1 + \operatorname{arctg} \frac{y}{x} \right)^2}$ $\frac{\sqrt[3]{1+x^3}}{x} + \frac{1}{\sqrt{3}} \operatorname{arctg} \frac{2\sqrt[3]{1+x^3}+x}{x\sqrt{3}}$

28	$\frac{3b}{2} \sqrt{\frac{ab}{b^2 - a^2}}$ $-\frac{\cos x}{2 \sin^2 x} + \frac{1}{2} \ln \left \operatorname{tg} \frac{x}{2} \right $ $\frac{1}{\sqrt{3}} \ln \left \frac{3 + 3x + 2\sqrt{3(x^2 + x + 1)}}{x - 1} \right $ $\frac{x^2}{2} - 2x + \frac{1}{6} \ln \frac{ x-1 (x+2)^2}{ x+1 ^3}$ $\ln \frac{\sqrt{x^2 + 2x + 4} - 1}{\sqrt{x^2 + 2x + 4} + 1} - \frac{1}{\sqrt{2}} \operatorname{arctg} \frac{\sqrt{2(x^2 + 2x + 4)}}{x + 1}$	31	$2 \ln \left(e^{\frac{x}{2}} + e^{-\frac{x}{2}} \right)$ $\frac{1}{4} \left[\ln(1 + x^4) + \frac{1}{1 + x^2} \right]$ $\frac{x^3}{4(1 + x^2)^2} - \frac{3x}{8(1 + x^2)} + \frac{3 \operatorname{arctg} x}{8}$ $2 \ln \frac{u - 1}{\sqrt{u^2 + u + 1}} - 2\sqrt{3} \operatorname{arctg} \frac{2u + 1}{\sqrt{3}}$ $\frac{1}{\sqrt{2}} \left[3 \ln(x + \sqrt{1 + x^2}) + \frac{1}{3} (x^2 - 2)\sqrt{1 + x^2} \right]$
29	$\frac{1}{8} \ln \frac{2 + \cos 2x}{2 - \cos 2x}$ $\frac{e^x}{2} \left(1 - \frac{2 \sin 2x + \cos 2x}{5} \right)$ $\frac{(x^2 + 1) \operatorname{arctg} x}{\sqrt{x}} - 2\sqrt{x}$ $\frac{x^2}{2} + \frac{x}{2} \sqrt{x^2 - 1} - \frac{1}{2} \ln x + \sqrt{x^2 - 1} $ $\left(\frac{1}{4} x^3 - \frac{3}{8} x \right) \sqrt{x^2 + 1} + \frac{3}{8} \ln(x + \sqrt{x^2 + 1})$	32	$\frac{4kx}{(x^2 + y^2 + z^2)^3}$ $3 \left[\ln u - \ln(1 + \sqrt{1 - u^2}) - \arcsin u \right]$ $\frac{\sqrt{4 + x^2} (x^2 - 2)}{24x^3}$ $\ln x + 1 + \sqrt{2x + x^2} - \frac{4}{x + \sqrt{2x + x^2}}$ $3 \left[\ln \left \frac{\sqrt[3]{x}}{1 + \sqrt[3]{x}} \right + \frac{2\sqrt[3]{x} + 3}{2(1 + \sqrt[3]{x})^2} \right]$

5. Excel for Windows

T, K					rho,
	Eg,	ni, -3	μ, 2/ /	n, -3	
300	1,12	6,2E+09	1,3E+03	1,0E+13	
320	1,12	2,9E+10	1,1E+03	1,0E+13	
340	1,11	1,2E+11	9,8E+02	1,0E+13	
360	1,11	4,0E+11	8,6E+02	1,0E+13	

380	1,10	1,2E+12	7,5E+02	1,0E+13	
400	1,10	3,3E+12	6,6E+02	1,1E+13	
420	1,09	8,2E+12	5,9E+02	1,5E+13	
440	1,08	1,9E+13	5,3E+02	2,4E+13	
460	1,08	4,1E+13	4,7E+02	4,6E+13	
480	1,07	8,2E+13	4,3E+02	8,7E+13	
500	1,07	1,6E+14	3,9E+02	1,6E+14	

$$\rho = \frac{1}{Qn\mu}, \quad Q = 1,6 \cdot 10^{-19}.$$

»

2

					$\psi, \%$	$\delta, \%$, %
	$L_0,$	$F_0,$	$L_1,$	$F_1,$			
1	25	20	36	8			0,1
2	27	22	35	10			0,2
3	28	24	34	12			0,3
4	30	26	33	14			0,4

$$\psi = \frac{F_0 - F_1}{F_0} \cdot 100\%, \quad \delta = \frac{L_1 - L_0}{L_0} \cdot 100\%.$$

3

$\beta (\quad)$ 5 -

$$\beta = \frac{U_0}{n_0}, \quad U_0 - \quad , n ;$$

$n_0 - \quad \ll \quad \gg.$

$q = n, n -$ « ».
 $q1, q2, K,$
 :

	Uo, B	Co, n	n _o	U, B	$\beta,$ / .	n1	q1	n2	q2
1	60	7500	45	20		22		24	
2	60	7500	46	40		45		45	
3	60	7500	44	60		63		54	
4	60	7500	43	80		84		76	
5	60	7500	47	100		106		92	

« » -

4

	,			,		
	654836	254135	547812	10000	20000	20000
	36547	54782	25471	10000	20000	20000
	21479	62145	251448	10000	20000	20000
	962147	997125	951254	10000	20000	20000
	458721	36547	365478	10000	20000	20000

) , (-
 » «

5

	86	54	59	63
	54	46	61	71

	71	87	43	58
	45	89	35	45
	127	74	48	60

(-
 * -
); (-
 * -
 + , -
 *) .
 () .

* -

6

:

	400
	70
, ... °	5

()

$$(\) = \frac{10}{\left(\frac{-}{22} \right)^{1.5}} \frac{(tg(45 - 2\beta))^4}{e^{\sqrt{-}}}$$

20, 25, 30, 35, 40, 45, 50 / . , 10, 15,

7

	l,	N	P	qc, /	d,	V, /	i	1+k _l	ΔH,
1-2	1,4	1	0,0078	0,20	15			1,3	
2-3	1,2	2	0,0078	0,20	15			1,3	

3-4	2,8	3	0,0078	0,23	20			1,3	
4-5	2,8	6	0,0078	0,27	20			1,3	
5-6	5,8	9	0,0078	0,31	20			1,3	
6-7	3,6	18	0,0078	0,39	20			1,3	
7-8	8,4	27	0,0078	0,45	25			1,3	
8-9	3,6	36	0,0078	0,51	25			1,3	
9-10	19,7	81	0,0078	0,76	32			1,3	
=									

: l, - ; N - ; P - -

; qc, / - ; d, - -

; V, / = $1000 \cdot qc / (\frac{\pi d^2}{4})$ - ; i =

$$1,735 \cdot 0,001 \cdot \frac{(qc/1000)^2}{(d/1000)^{5,3}} -$$

; $1+k_l -$

; $\Delta H, = il(l+k_i) -$

8

$\Delta t=1/60$

x.

t,	x,	v, /	, / ²
0	0	-	-
0,0167	1,55		
0,0333	3,25		
0,0500	5,30		
0,0667	7,55		
0,0833	10,20		
0,1000	13,05		
0,1167	16,15		
0,1333	19,50		
0,1500	23,15		
0,1667	27,05		
0,1833	31,30		
0,2000	35,75		
0,2167	40,55		
0,2333	45,55		
0,2500	50,80		

$$v_t = \frac{x_{t+\Delta t} - x_t}{\Delta t}, \quad a_t = \frac{x_{t+\Delta t} - 2 \cdot x_t + x_{t-\Delta t}}{(\Delta t)^2}.$$

9

L=42,5 S=7,065

	U, B	I, A
1	1,6	0,5
2	1,2	0,4
3	2,2	0,7

$$R = \frac{U}{I},$$

$$\rho = \frac{RS}{L}.$$

10

a=3,59 b=0,0427

T, K	v, /
264	0,10
264	0,15
264	0,20
264	0,25
264	0,30
264	0,35
264	0,40
304	0,10
304	0,15
304	0,20
304	0,25
304	0,30
304	0,35

304	0,40
344	0,10
344	0,15
344	0,20
344	0,25
344	0,30
344	0,35
344	0,40

(v) , $\therefore = \frac{8,3143/101,3}{v-b} - \frac{a}{v^2}$.

11

:

$$Pz = 4230v^{-0,28}s^{0,56}t^{0,64}$$

$$Py = 2121v^{-0,25}s^{0,59}t^{0,61}$$

$$Px = 561v^{-0,03}s^{0,36}t^{0,82}$$

:

v, / .	s, / .	t,
18,8	0,07	0,5
37,6	0,26	0,5
37,6	0,07	1,5
37,6	0,07	0,5
18,8	0,26	1,5
18,8	0,26	0,5
18,8	0,07	1,5
37,6	0,26	1,5

12

-	, %	d ₀ ,	p ,	p ,	F ₀ ,		
---	-----	------------------	-----	-----	------------------	--	--

1	0,1	5	8400	14200			
2	0,2	5	9000	14800			
3	0,3	5	9600	15400			
4	0,4	5	10200	16000			
5	0,5	5	10800	16600			
6	0,6	5	11400	17200			

β , % – ; d_0 , – ; p , – ; p , – ; $F_0 = \frac{\pi d_0^2}{4}$ – ; (p / Fo) ; (p / Fo) .

13

	β , /	n_1	C_1 ,	n_2	n_2 ,	,	,
1	10	65		55			
2	9,78	63		59			
3	10,23	66		62			
4	10,47	64		60			
5	9,57	62		57			

β – ; n_1, n_2 – ; C_1, C_2 , – ; $U_0=60$ – ; $n_1 = \frac{\beta n_1}{U_0}$; $n_2 = \frac{\beta n_2}{U_0}$; $n = n_1 + n_2$; $C = \frac{C_1 C_2}{C_1 + C_2}$.

14

V_0 , : α

$$x(t) = v_0 t \cos \alpha,$$

$$y(t) = v_0 t \sin \alpha - \frac{gt^2}{2}.$$

:

x	y(x)
0	
2	
4	
6	
...	

$$y(x) = x \tan \alpha - \frac{gx^2}{2v_0^2 \cos^2 \alpha}, \quad g = 9,8 \text{ / } ^2.$$

« -

», . . . $y(x)$

: 1) $\alpha = \pi/3; v_0 = 35 \text{ /}$; 2) $\alpha = \pi/4; v_0 = 30 \text{ /}$. -

(-

).

(,

).

15

-

45

50

,

5 10,

:

$$\theta = 70v^{0,84} s^{0,36} t^{0,17}.$$

:

v, /	s, /	t,
31,4	0,26	1,0
62,8	0,26	1,0
94,2	0,26	1,0
62,8	0,13	1,0
62,8	0,39	1,0
62,8	0,26	0,5
62,8	0,26	1,5

t.

16

, ,

$$=10 \frac{5+}{5} \frac{-}{5}$$

:

	-5	-3	-1	1	3	5
-5						
-3						
-1						
1						
3						
5						

17

	m,	,	
		1	2
1	140	300	330
2	150	310	340
3	155	320	350
4	160	330	355
5	170	340	360

$$= 32 \cdot 10^{-3} /$$

$$R=8,31 / () .$$

$$= 29 / (\cdot) .$$

$$Q = \frac{m}{M} C_p (T_2 - T_1).$$

$$A = \frac{m}{M} R (T_2 - T_1).$$

18

$$K = \frac{K_o}{T - T_o}$$

T, K	K, / (·K)
200	
250	
300	
350	
400	
450	
500	
550	
600	

: $K_o = 350, T_o = 68.$

(. .

).

«

»

19

	V, ³			
		m ₁	m ₂	
1	2	4	2	300
2	2,5	3,5	2,5	350
3	3	3	3	250
4	3,5	4,5	1,5	400
5	4	5	1	450

6	4,5	6	2	550
---	-----	---	---	-----

$$n_1 = 4 \cdot 10^{-3} \text{ / } , \quad n_2 = 2 \cdot 10^{-3} \text{ / } .$$

$$R = 8,31 \text{ / (} \cdot \text{)} .$$

$$p = \left(\frac{m_1}{M_1} + \frac{m_2}{M_2} \right) \frac{RT}{V} .$$

$$M = \frac{m_1 + m_2}{m_1/M_1 + m_2/M_2} .$$

20

	m,	
1	1	400
2	1,5	410
3	2	425
4	2,5	430
5	3	440
6	3,5	450

$$= 2 \cdot 10^{-3} \text{ / } .$$

$$R = 8,31 \text{ / (} \cdot \text{)} .$$

$$: \quad = \frac{3m}{2M} RT , \quad = \frac{m}{M} RT .$$

21

S, ²
0,01
0,015
0,02

0,025
0,03
0,035

$$Q = 10^{-6} \text{ .}$$

$$Q_0 = 8,85 \cdot 10^{-12} \text{ / .}$$

$$= 6.$$

$$W = \frac{Q^2}{2\epsilon\epsilon_0 S^2} \text{ .}$$

$$F = \frac{Q^2}{2\epsilon\epsilon_0 S} \text{ .}$$

22

1	200	99800
2	245	99900
3	280	99995
4	300	100000
5	325	100010

$$= 28 \cdot 10^{-3} \text{ / .}$$

$$R = 8,31 \text{ / (.)}$$

$$Q_0 = 1,25 \text{ / }^3 \text{ .}$$

$$Q_0 = 1,01 \cdot 10^5 \text{ .}$$

$$Q_0 = 273 \text{ .}$$

$$d = 3,1 \cdot 10^{-10} \text{ .}$$

$$= 1,38 \cdot 10^{-23} \text{ / .}$$

$$\text{ , }^2 \text{ ,}$$

$$D = \frac{2KT}{3\pi d^2 p} \sqrt{\frac{RT}{\pi M}} \text{ .}$$

$$\text{ , / (.)}$$

$$\text{ : } \eta = \frac{D\rho_0 p T_0}{p_0 T}$$

23

$$m = 10 \text{ .}$$

1
1,5
2
2,5
3
3,5
4
4,5
5

= 0,02 .

$$A = \frac{1}{w} \sqrt{\frac{2E}{m}}, \quad \omega = \frac{2\pi}{T}$$

24

	m ₁	m ₂		
1	75	300	285	98500
2	80	310	290	99900
3	85	320	300	100500
4	90	295	305	101000
5	95	290	310	101500
6	100	280	320	102000

$$n_1 = 32 \cdot 10^{-3} / \text{m}^3, \quad n_2 = 40 \cdot 10^{-3} / \text{m}^3$$

$$R = 8,31 \text{ J/(mol} \cdot \text{K)}$$

$$V = \left(\frac{m_1}{M_1} + \frac{m_2}{M_2} \right) \frac{RT}{p}$$

m₁, m₂, T, V.

	N	I,	,
1	1100	4	0,000006
2	1115	3	0,000007
3	1120	2	0,000008
4	1125	3	0,0000065
5	1130	5	0,000007
6	1135	4	0,0000075
7	1140	3	0,000008

$$L = \frac{N}{I} .$$

$$W = \frac{1}{2} LI^2 .$$

1 . Excel , / .- .:

 , 1999.- 528 .

2 « »/ .

 .- : , 2000.-56 .

3 : ,

-

/ , , . ; . . .

.- 2- ., .- . . , 2001.- 143 .

.....	3
.....	5
1	6
2	6
3	7
4	7
5	12
.....	27

« »

2

,

. 60 84/16.
. . . 1,75. .- . . 1,27.

. 84313, . , . , 72.