

## ЛАБОРАТОРНАЯ РАБОТА 1

Тема: Линейные вычисления в математическом пакете MathCad.

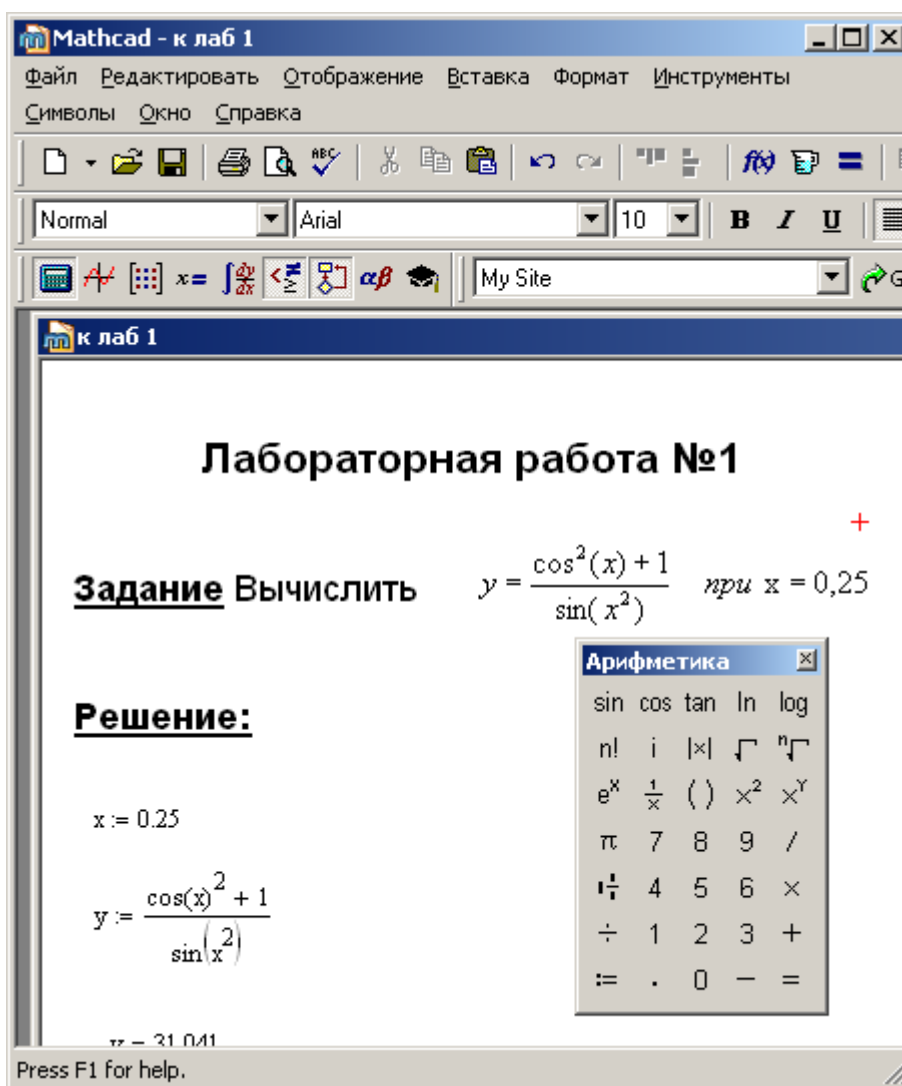


Рис.1

**Задание 1** Вычислите значения выражений лабораторной работы 8 (MS Excel), задание 2.

**Задание 2** Вычислите значения выражений, приведенных ниже. Пример оформления представлен на Рис.1

### Вариант 1

- $z = \sqrt{0,45 + x^3 + (x^2 - 1)^2}; \quad x = 3,8$
- $z = \frac{7,2 \cdot \ln|x-1| - e^{t-1}}{x^{2,4} - t^2}; \quad x = 0,58; \quad t = 0,3$
- $z = \frac{\sin^3(\alpha^2 + \beta)}{\cos(2,8 \cdot \gamma + \alpha)}; \quad \alpha = \frac{\pi}{4}; \quad \beta = 0,4; \quad \gamma = \frac{\pi}{8}$

$$4. \quad z = u + v; \quad \partial \partial e \quad u = \frac{\sqrt[3]{x^3 + 2}}{0,5 \cdot (x^2 + 1)} \sin 3x; \quad v = (1 - y)^2 / (1 - \cos^2 y); \quad x = 7,3; \quad y = 0,3$$

$$5. \quad l = k^{m-1} + \ln(x^3 - y) + \frac{\sqrt[3]{x+y}}{\operatorname{ctg}(z+1)}; \quad k = 3; \quad m = 3; \quad x = 4,7; \quad y = 5,8; \quad z = 4,9$$

### Вариант 2

$$1. \quad z = 2,58(x^3 - 1) - \ln(x^2 + 3); \quad x = 5,1$$

$$2. \quad z = \frac{e^{2x} - e^t}{\lg |x^3 - t|}; \quad x = 1,3; \quad t = 6,2$$

$$3. \quad z = \frac{\cos(\alpha^2 + \beta) - \sin \alpha}{\operatorname{tg}(\pi + \alpha)}; \quad \alpha = 0,3; \quad \beta = 2,1$$

$$4. \quad z = uv; \quad \partial \partial e \quad u = \sqrt{x^3 - a^3} + a; \quad v = \ln|x - a|; \quad 8,055; \quad x = 0,2; \quad a = 2,72$$

$$5. \quad l = m^{k+1} - \operatorname{tg}(k + 1,8) - \frac{1}{\sqrt{x-1}}; \quad m = 3; \quad k = 2; \quad x = 1,56$$

### Вариант 3

$$1. \quad z = 0,082 \cdot x^3 + e^{x+1}; \quad x = 1,53$$

$$2. \quad z = [\lg(y^3 + 7,51) - y] / |y - 8,08|; \quad y = 6,22$$

$$3. \quad z = \operatorname{tg}(x^2 + y^3) / [\cos^2(x^2 + y) - \cos x]; \quad x = \pi/3; \quad y = 0,2$$

$$4. \quad z = uA; \quad \partial \partial e \quad u = \lg^2(x - 1); \quad A = 9,5(y^{0,3} - e^x); \quad x = 5,85; \quad y = 21,3$$

$$5. \quad l = k^{n+2} - \operatorname{tg}(\cos(x + y)); \quad k = 2; \quad n = 1; \quad x = 0,33; \quad y = \pi/4$$

### Вариант 4

$$1. \quad z = x^{1/2} + (3,37 \cdot x + 2,03)^2; \quad x = 2,8$$

$$2. \quad z = \frac{\cos(w-1) + \ln(w^2 + 3)}{0,58 \cdot t}; \quad w = 2,65; \quad t = 2,7$$

$$3. \quad z = \frac{\operatorname{tg}^2(\alpha - \beta) + \cos^2 \alpha}{\sin(\alpha + \beta)}; \quad \alpha = \frac{\pi}{3}; \quad \beta = 0,2$$

$$4. \quad z = u \cdot t, \quad \partial \partial e \quad u = \sqrt{|x^{1/3} - a^{1/2}|}; \quad t = \ln(a^{1/2} + e^x); \quad x = 15,73; \quad a = 4,25$$

$$5. \quad y = h^{v-f} + \sin^2(v + f) - \frac{\sqrt{v}}{\ln f}; \quad h = 3; \quad v = 2,5; \quad f = 2$$

### Вариант 5

$$1. \quad z = x^{1/2} + (3,4 \cdot x + 12,3)^2; \quad x = 12,8$$

$$2. \quad \frac{\sin(x-1) + \lg(x^2 - 1)}{0,51t}; \quad x = 3,25; \quad t = 2,02$$

$$3. \quad z = \frac{\operatorname{tg}(\alpha - \beta) + \cos^2 \alpha}{\sin(\alpha + \beta)}; \quad \alpha = \frac{\pi}{3}; \quad \beta = 0,05$$

$$4. \quad z = u \cdot t, \quad \partial \partial e \quad u = \sqrt{|x^{1/3} - a^{1/2}|}; \quad t = \ln(a^{1/2} + x^{1/3}); \quad x = 18,08; \quad a = 11,75$$

$$5. \quad l = k^{m-n} + \cos^2(m+n \cdot x) - \frac{\sqrt{m}}{\log_2 n}; \quad k = 3; \quad m = 5; \quad n = 2; \quad x = 2,3$$

### Вариант 6

$$1. \quad z = 2,198x^2 - (x^{\frac{1}{2}} + 1)^2; \quad x = 3,75$$

$$2. \quad z = \frac{\cos x^2 - \sin^2 y}{\cos y^2 - \sin x}; \quad x = 0,51; \quad y = 0,2$$

$$3. \quad z = \frac{\cos|\alpha + \beta|}{\sin \gamma + \cos \alpha + \operatorname{tg} \beta}; \quad \alpha = \frac{\pi}{6}; \quad \beta = 0,2; \quad \gamma = 0,4$$

$$4. \quad z = u \cdot v; \quad \text{где } u = \sqrt{x^3 - a^3} + a; \quad v = 6,5 \cdot \ln|x - a|; \quad x = 0,2; \quad a = 2,72$$

$$5. \quad l = m^{k-1} - \operatorname{ctg}(m - k) - \frac{1}{\sqrt{x-1}}; \quad m = 3; \quad k = 2; \quad x = 1,41$$

### Вариант 7

$$1. \quad z = 0,65(x^2 - 2) + x^{1/3}; \quad x = 13,58$$

$$2. \quad z = (e^{x-1,2} + e^{1,2+x}) / \ln(0,1t); \quad t = 53,5; \quad x = 2,5$$

$$3. \quad z = \left[ \cos^2 \alpha + \frac{\sin \alpha}{\cos(\alpha - \beta)} \right] \div \sin^2(\alpha - \beta); \quad \alpha = \frac{\pi}{3}; \quad \beta = \frac{\pi}{8}$$

$$4. \quad z = u \cdot y; \quad \text{где } u = \left| \ln|c^2 - 7,25| \right|; \quad c = 2,1; \quad y = \sqrt{a-b} \cdot \cos \frac{a}{b}; \quad a = 1,1; \quad b = 0,5$$

$$5. \quad l = \frac{m^2 + k^m \cdot \operatorname{tg}|z|}{\sin(z+1)}; \quad m = 3; \quad k = 2; \quad z = 0,3$$

### Вариант 8

$$1. \quad z = (8,59 - x^{1/3}) - (1 - \ln x); \quad x = 0,53$$

$$2. \quad z = \left[ \lg(x^2 + 1) + e^{x-1} \right] / (x^2 - t); \quad x = 4,8; \quad t = 3,27$$

$$3. \quad z = \left[ \operatorname{tg}(\alpha - \beta)^2 - 1 \right] / \cos^2(\gamma - 1); \quad \alpha = \pi/6; \quad \beta = 0,3; \quad \gamma = 2,1$$

$$4. \quad z = x \cdot y; \quad \text{где } x = \sqrt[3]{2,8u^2 - a}; \quad y = \left| \cos^2(t-1) / \sin(t+1) \right|; \quad u = 1,4; \quad a = 0,8; \quad t = 3,8$$

$$5. \quad l = n^k + \frac{\sqrt[4]{z^3}}{\ln x} + \sin \left| \frac{x}{2} \right|; \quad n = 2; \quad k = 3; \quad z = 7,7; \quad x = 0,8$$

### Вариант 9

$$1. \quad z = 2,58(x^3 - 1) - \ln(x+1); \quad x = 5,1$$

$$2. \quad z = \frac{e^{2x} - e^{2t}}{\ln|x-t|}; \quad x = 1,3; \quad t = 6,2$$

$$3. \quad z = \frac{\cos(\alpha^2 + \beta) - \sin^2 \beta}{\operatorname{tg}(\pi + \alpha + \beta)}; \quad \alpha = 0,3; \quad \beta = 2,1$$

$$4. \quad z = u \cdot v; \quad \text{где } u = \sqrt{|x^3 - a^3|} + a; \quad v = 12,35 \cdot \ln|x - a|; \quad x = 0,82; \quad a = 2,72$$

$$5. \quad l = m^{k-1} - \operatorname{tg}(m+k) - \frac{1}{\sqrt{x-1}}; \quad m = 3; \quad k = 2,5; \quad x = 2,41$$

**Вариант 10**

- $z = (24,6 + x - a^2)^2 + \ln x^3$ ;  $x = 0,3$ ;  $a = 1,72$
- $z = 1 - \left( \frac{1}{e^x} + e^{x+1} \right) / \sin^2 x$ ;  $x = 1,32$
- $z = \left[ \frac{\cos^2 \alpha}{\sin(\alpha - 1)} - 1,2^{0,2} \right] / [2,5 - \cos(\alpha + \beta)]$ ;  $\alpha = \frac{\pi}{3}$ ;  $\beta = 0,7$
- $z = \frac{u}{v}$ ;  $z \partial e u = \left| \sqrt{1 - y^2} \right| \cdot \sin|x|$ ;  $v = \lg y \cdot |1 - \sin y|$ ;  $y = 0,5$ ;  $x = \frac{\pi}{8}$
- $l = k^m + \frac{1}{1 - \sin m} \cdot \frac{\sqrt{n}}{k + x}$ ;  $k = 2$ ;  $m = 3$ ;  $n = 2$ ;  $x = 2,15$

**Вариант 11**

- $z = (a - 2,3)^2 \cdot (x^2 - 1)^2$ ;  $x = 2,58$ ;  $a = 0,3$
- $z = (e^x - 1) \cdot (1 - e^{-x-1}) / (1 - x)$ ;  $x = 1,55$
- $z = \left| \ln x + \frac{\sin(\alpha + \beta)^2}{\cos \gamma^2} \right|$ ;  $x = 0,25$ ;  $\alpha = \pi/3$ ;  $\beta = 0,5$ ;  $\gamma = 0,1$
- $z = u + v$ ;  $z \partial e u = \frac{\sqrt[5]{x^3 + 1}}{0,3 \cdot (x^2 + 1)} \sin x$ ;  $v = (1 - y)^2 / (1 - \cos y)$ ;  $x = 7,3$ ;  $y = 0,3$
- $e = (m + n)^{k-1} - (x - \sin x)^{k-1}$ ;  $m = 3,3$ ;  $n = 1$ ;  $k = 3$ ;  $x = 2,5$

**Вариант 12**

- $z = 2,5(x + 1)^2 + a(x^2 - 1)^2$ ;  $x = 2,58$ ;  $a = 0,5$
- $z = 7 - (10 - e^{x+1}) / (1 + x)$ ;  $x = 0,35$
- $z = \lg x + \frac{\sin(\alpha + \beta)^2}{\cos^2 \gamma}$ ;  $x = 18,2$ ;  $\alpha = \pi/3$ ;  $\beta = 0,3$ ;  $\gamma = 0,2$
- $z = u - v$ ,  $z \partial e u = \frac{\ln 3y}{\sqrt{y^2 + 1}}$ ;  $v = \sqrt{\left| 1 - \frac{y^2}{3} \right|}$ ;  $y = 5,7$
- $l = k^m + \frac{\operatorname{tg} 3x}{(1 - m) \sin 2x}$ ;  $k = 3$ ;  $m = 2$ ;  $x = 0,38$

**Вариант 13**

- $z = \sqrt{0,45 + x^3} + (x^2 - 1)^2$ ;  $x = 3,8$
- $z = \frac{7,2 \cdot \ln|x - 1| - e^{t-1}}{x^{2,4} - t^2}$ ;  $x = 0,58$ ;  $t = 0,3$
- $z = \frac{\sin^3(\alpha^2 + \beta)}{\cos(2,8 \cdot \gamma + \alpha)}$ ;  $\alpha = \frac{\pi}{4}$ ;  $\beta = 0,4$ ;  $\gamma = \frac{\pi}{8}$
- $z = u + v$ ;  $z \partial e u = \frac{\sqrt[3]{x^3 + 2}}{0,5 \cdot (x^2 + 1)} \sin 3x$ ;  $v = (1 - y)^2 / (1 - \cos^2 y)$ ;  $x = 7,3$ ;  $y = 0,3$
- $l = k^{m-1} + \ln(x^3 - y) + \frac{\sqrt[3]{x + y}}{\operatorname{ctg}(z + 1)}$ ;  $k = 3$ ;  $m = 3$ ;  $x = 4,7$ ;  $y = 5,8$ ;  $z = 4,9$

**Вариант 14**

6.  $z = 2,58(x^3 - 1) - \ln(x^2 + 3); , x = 5,1$

7.  $z = \frac{e^{2x} - e^t}{\lg|x^3 - t|}; x = 1,3; t = 6,2$

8.  $z = \frac{\cos(\alpha^2 + \beta) - \sin\alpha}{\operatorname{tg}(\pi + \alpha)}; \alpha = 0,3; \beta = 2,1$

9.  $z = uv; \text{ где } u = \sqrt{x^3 - a^3} + a; v = \ln|x - a| 8,055; x = 0,2; a = 2,72$

1.  $l = m^{k+1} - \operatorname{tg}(k + 1,8) - \frac{1}{\sqrt{x-1}}; m = 3; k = 2; x = 1,56$

**Вариант 15**

6.  $z = 0,082 \cdot x^3 + e^{x+1}; x = 1,53$

7.  $z = [\lg(y^3 + 7,51) - y] / |y - 8,08|; y = 6,22$

8.  $z = \operatorname{tg}(x^2 + y^3) / [\cos^2(x^2 + y) - \cos x]; x = \pi/3; y = 0,2$

9.  $z = uA; \text{ где } u = \lg^2(x - 1); A = 9,5(y^{0,3} - e^x); x = 5,85; y = 21,3$

1.  $l = k^{n+2} - \operatorname{tg}(\cos(x + y)); k = 2; n = 1; x = 0,33; y = \pi/4$