Lösungen

1

a

$$\begin{pmatrix} 2 & -1 & 6 \\ 4 & 4 & 1 \\ -1 & 5 & 3 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 2 & 1 \\ 3 & 5 & 1 \\ -1 & 1 & 1 \end{pmatrix}$$

$$\begin{pmatrix} -6 & 24 & 29 \\ 23 & 17 & 31 \\ 15 & 36 & 8 \end{pmatrix}$$

$$\begin{pmatrix} -42 & 141 & 84 \\ 86 & 66 & 149 \\ 81 & 130 & 12 \end{pmatrix}$$

b

$$\begin{pmatrix} -\frac{2}{9} & \frac{8}{57} & -\frac{11}{171} \\ \frac{1}{18} & -\frac{13}{456} & \frac{139}{1368} \\ \frac{1}{6} & -\frac{11}{152} & -\frac{11}{456} \end{pmatrix}$$

$$\begin{pmatrix} -0.222222 & 0.140351 & -0.0643275 \\ 0.0555556 & -0.0285088 & 0.101608 \\ 0.166667 & -0.0723684 & -0.0241228 \end{pmatrix}$$

2

a

171

b

58653

c

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1 /
 19934761274910836250085427126368104057113963245867099885687793753147757707920769…
    20929685535673411062644795012173879708026271965412448171008173226029977661717238…
    696866388303865899080731020806059816174588219540290898971422001
```

5.01636×10^{-224}

3

a

$$\begin{pmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 1 & 0 \\ 3 & 2 & 1 \\ 4 & 3 & 2 \end{pmatrix}$$

$$\begin{pmatrix} 29 & 20 & 11 \\ 38 & 26 & 14 \\ 47 & 32 & 17 \end{pmatrix}$$

$$\begin{pmatrix} 7 & 10 & 13 \\ 16 & 22 & 28 \\ 25 & 34 & 43 \end{pmatrix}$$

$$\begin{pmatrix} 36 & 30 & 24 \\ 54 & 48 & 42 \\ 72 & 66 & 60 \end{pmatrix}$$

4

$$\begin{pmatrix} 2 & -1 & 6 \\ x & 4 & x^2 \\ -1 & 5 & 3 \end{pmatrix}$$

$48 + 33 \, x - 9 \, x^2$

$$\left\{ \left\{ x \to \frac{1}{6} \left(11 - \sqrt{313} \right) \right\}, \left\{ x \to \frac{1}{6} \left(11 + \sqrt{313} \right) \right\} \right\}$$

$\{\{x \to -1.1153\}, \{x \to 4.78197\}\}$

5

$$\begin{pmatrix} 1 & 0 & 1 & 2 & 5 \\ 2 & 2 & 2 & 3 & 5 \\ 3 & 2 & 1 & -1 & 5 \\ -1 & -2 & 1 & 1 & 5 \end{pmatrix}$$

$$\left\{\left\{x1 \to -2 - \frac{5\,x5}{2}, \; x2 \to 1 + \frac{5\,x5}{2}, \; x3 \to 5 - \frac{5\,x5}{2}, \; x4 \to -2\right\}\right\}$$

6

$\{4 + 2\,x, \; -2 + 4\,y, \; 0\}$

a

$\{10, 6, 0\}$

$\{10, 6\}$

b

$\{1, -3\}$

$\left\{\frac{1}{\sqrt{10}}, \; -\frac{3}{\sqrt{10}}\right\}$

$\{0.316228, -0.948683\}$

$-9\sqrt{\frac{2}{5}} + \sqrt{10}$

-2.52982

b1, Variante

$\{4, -1\}$

$\left\{\frac{4}{\sqrt{17}}, \; -\frac{1}{\sqrt{17}}\right\}$

$\{0.970143, -0.242536\}$

$2\sqrt{17}$

8.24621

c

$$\left\{\left\{x \to -2, y \to \frac{1}{2}\right\}\right\}$$

7

a

$$\begin{pmatrix} 1 & 1 & -1 \\ -1 & -1 & 2 \\ 1 & 4 & 1 \end{pmatrix}$$

b

$$\left\{\left\{3, -1-\sqrt{2}, -1+\sqrt{2}\right\}, \left\{\{-2, 5, 9\}, \left\{2-\sqrt{2}, -1, 1\right\}, \left\{2+\sqrt{2}, -1, 1\right\}\right\}\right\}$$

$$\{\{3., -2.41421, 0.414214\}, \{\{-2., 5., 9.\}, \{0.585786, -1., 1.\}, \{3.41421, -1., 1.\}\}\}$$

$$\left\{3, -1-\sqrt{2}, -1+\sqrt{2}\right\}$$

$$\{3., -2.41421, 0.414214\}$$

$$\left\{\{-2, 5, 9\}, \left\{2-\sqrt{2}, -1, 1\right\}, \left\{2+\sqrt{2}, -1, 1\right\}\right\}$$

$$\{\{-2., 5., 9.\}, \{0.585786, -1., 1.\}, \{3.41421, -1., 1.\}\}$$

c

$$\left\{-18 - \sqrt{2}\left(-1-\sqrt{2}\right) + \sqrt{2}\left(-1+\sqrt{2}\right),\right.$$
$$\left. 45 + \left(1-\sqrt{2}\right)\left(-1+\sqrt{2}\right) + \left(-1-\sqrt{2}\right)\left(1+\sqrt{2}\right), 81 + \left(-1-\sqrt{2}\right)^2 + \left(-1+\sqrt{2}\right)^2\right\}$$

$$\{-14., 39., 87.\}$$