

# Matematika 0

## Cvičení 5

**Příklad 1:** Násobení matic:

$$\bullet \text{ a) } \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix} \begin{pmatrix} 1 & 3 & 2 & -1 \\ 2 & -1 & -1 & 0 \end{pmatrix} =$$

$$\bullet \text{ b) } \begin{pmatrix} 1 & 2 \\ -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & -1 & 3 \\ -1 & 1 & 2 & -1 \end{pmatrix} =$$

$$\bullet \text{ c) } \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \begin{pmatrix} 2 & -1 & 3 \end{pmatrix} =$$

$$\bullet \text{ d) } \begin{pmatrix} 2 & -1 & 3 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ -1 & 1 \\ 2 & 3 \end{pmatrix} =$$

$$\bullet \text{ e) } \begin{pmatrix} 1 & 0 & -1 \\ -1 & -1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 2 \\ -1 & 3 \\ 4 & 1 \end{pmatrix} =$$

$$\bullet \text{ f) } \begin{pmatrix} 0 & -1 & -3 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} =$$

$$\bullet \text{ g) } \begin{pmatrix} 3 & 2 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 0 & -1 \end{pmatrix} =$$

$$\bullet \text{ h) } \begin{pmatrix} 1 & -1 & 0 \end{pmatrix} \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix} =$$

**Příklad 2:** Výpočet determinantu:

$$\bullet \text{ a) } \begin{vmatrix} 1 & -1 \\ -1 & 1 \end{vmatrix} =$$

$$\bullet \text{ b) } \begin{vmatrix} 2 & 2 \\ 4 & 3 \end{vmatrix} =$$

$$\bullet \text{ c) } \begin{vmatrix} 2 & 0 & 1 \\ 1 & 0 & 3 \\ 1 & 2 & 1 \end{vmatrix} =$$

$$\bullet \text{ d) } \begin{vmatrix} 0 & 1 & 0 \\ 2 & 0 & 3 \\ 0 & 4 & 0 \end{vmatrix} =$$

$$\bullet \text{ e) } \begin{vmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{vmatrix} =$$

$$\bullet \text{ f) } \begin{vmatrix} 1 & 5 & 6 \\ 0 & 2 & 7 \\ 0 & 0 & 3 \end{vmatrix} =$$

$$\bullet \text{ g) } \begin{vmatrix} 3 & -2 \\ 1 & 2 \end{vmatrix} =$$

$$\bullet \text{ h) } \begin{vmatrix} -1 & 3 \\ 2 & -1 \end{vmatrix} =$$

**Příklad 3:** Řešte soustavu lineárních rovnic:

$$\bullet \text{ a) } \left( \begin{array}{cccc|c} 1 & 4 & 3 & -1 & 1 \\ 2 & 5 & 1 & -1 & -6 \\ -1 & 6 & 2 & 1 & -1 \\ -3 & 2 & 2 & 1 & 1 \end{array} \right) =$$

$$\bullet \text{ d) } \left( \begin{array}{ccc|c} 1 & 2 & 2 & 1 \\ -2 & 1 & 5 & 0 \\ 3 & 2 & 4 & 7 \end{array} \right) =$$

$$\bullet \text{ b) } \left( \begin{array}{cccc|c} 1 & -2 & 2 & 1 & 7 \\ -1 & 3 & 4 & 2 & 4 \\ 2 & 1 & 3 & 2 & 8 \\ 3 & 2 & 4 & -2 & 1 \end{array} \right) =$$

$$\bullet \text{ e) } \left( \begin{array}{ccc|c} 1 & -5 & 5 & 0 \\ -2 & 11 & -5 & 7 \\ 2 & -6 & 5 & 3 \end{array} \right) =$$

$$\bullet \text{ c) } \left( \begin{array}{ccc|c} 1 & -2 & 2 & -1 \\ -1 & 3 & 4 & 9 \\ 2 & 1 & 3 & 7 \end{array} \right) =$$

$$\bullet \text{ f) } \left( \begin{array}{cccc|c} 1 & 2 & -1 & 0 & 2 \\ 2 & 5 & 1 & 2 & 0 \\ -2 & -2 & 8 & 5 & -14 \end{array} \right) =$$

$$\bullet \text{ g) } \left( \begin{array}{cccc|c} 1 & 3 & 2 & -2 & 1 \\ 3 & 10 & 8 & -7 & 3 \\ -2 & -7 & -5 & 6 & 2 \end{array} \right) =$$

$$\bullet \text{ i) } \left( \begin{array}{cccc|c} 1 & 2 & 3 & 1 & 4 \\ -2 & -4 & -5 & -3 & -4 \\ 2 & 4 & 8 & -1 & 19 \\ 3 & 6 & 8 & 2 & 14 \\ 1 & 2 & 2 & 0 & 6 \end{array} \right) =$$

$$\bullet \text{ h) } \left( \begin{array}{cccc|c} 1 & 2 & 2 & -2 & 5 \\ -2 & -4 & -3 & 6 & -16 \\ 2 & 4 & 6 & 1 & -4 \end{array} \right) =$$

Řešení př.1:

$$\text{a) } \left( \begin{array}{cccc} -1 & 4 & 3 & -1 \\ 8 & 3 & 1 & -2 \end{array} \right), \text{ b) } \left( \begin{array}{cccc} -1 & 2 & 3 & 1 \\ -1 & 0 & 1 & -3 \\ -1 & 1 & 2 & -1 \end{array} \right), \text{ c) } \left( \begin{array}{ccc} 2 & -1 & 3 \\ 4 & -2 & 6 \\ 6 & -3 & 9 \end{array} \right), \text{ d) } (9 \quad 8),$$

$$\text{e) } \left( \begin{array}{cc} -4 & 1 \\ 1 & -5 \end{array} \right), \text{ f) } \left( \begin{array}{ccc} 0 & -1 & -3 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{array} \right), \text{ g) } \left( \begin{array}{cc} -3 & 4 \\ 1 & -4 \end{array} \right), \text{ h) } 1$$

Řešení př. 2:

a) 0, b) -2, c) -10, d) 0, e) 4, f) 6, g) 8, h) -5

Řešení př.3:

$$\text{a) } \left( \begin{array}{c} 3 \\ -2 \\ 4 \\ 6 \end{array} \right), \text{ b) } \left( \begin{array}{c} 1 \\ -1 \\ 1 \\ 2 \end{array} \right), \text{ c) } \left( \begin{array}{c} 1 \\ 2 \\ 1 \end{array} \right), \text{ d) } \left( \begin{array}{c} \frac{25}{13} \\ -\frac{20}{13} \\ \frac{14}{13} \end{array} \right), \text{ e) } \left( \begin{array}{c} 1 \\ 2 \\ 5 \end{array} \right), \text{ f) } \left( \begin{array}{c} 2+7t \\ -3t \\ t \\ -2 \end{array} \right), \text{ g) } \left( \begin{array}{c} 17-5t \\ 3t-8 \\ 4-t \\ t \end{array} \right),$$

$$\text{h) } \left( \begin{array}{c} 29-2t \\ t \\ -10 \\ 2 \end{array} \right), \text{ i) } \left( \begin{array}{c} 4-2t \\ t \\ 1 \\ -3 \end{array} \right)$$