Sustavi linearnih jednadžbi. Kronecker-Capellijev teorem

Matematika za ekonomiste 1

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Sadržaj

prvi zadatak

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

subdeterminanta reda 2

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

1. 2. 4. 5.

$\boxed{\text{subdeterminanta reda 2}}$

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

2.

4.

1.

5.

$\boxed{\text{subdeterminanta reda 2}}$

$$\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

subdeterminanta reda 2

$$\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix}$$

Zadatak 1

subdeterminanta reda 3

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

subdeterminanta reda 2

$$\begin{array}{ll} \begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{array}{l} \leftarrow 2. \\ \leftarrow 4. \end{array} \\ \;\uparrow\;\;\;\uparrow & \\ 1.\;\;5. & \end{array}$$

Zadatak 1

subdeterminanta reda 3

Odredite rang matrice

$$\begin{array}{c c}
A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} & \begin{matrix} \leftarrow 1. \\ \leftarrow 2. \\ \leftarrow 3. \\ \end{matrix} \\
\begin{matrix} \uparrow & & \uparrow & \uparrow & \\ 1. & & 3. & 4. & \end{matrix} &
\end{array}$$

subdeterminanta reda 2

$$\begin{array}{c c}
\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{matrix} \leftarrow 2. \\ \leftarrow 4. \end{matrix} \\
\begin{matrix} \uparrow & \uparrow \\ 1. & 5. \end{matrix} &
\end{array}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

subdeterminanta reda 3

$$\begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix}$$

subdeterminanta reda 2

$$\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{array}{cc} \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} & \begin{array}{l} 1. \\ 2. \\ 3. \\ \end{array} \\ \begin{array}{ccccc} 1. & & 3. & 4. & \end{array} & \end{array}$$

subdeterminanta reda 3

$$\begin{array}{cc} \begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{array}{l} 1. \\ 2. \\ 3. \end{array} \\ \begin{array}{ccc} 1. & 3. & 4. \end{array} & \end{array}$$

subdeterminanta reda 2

$$\begin{array}{cc} \begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{array}{l} 2. \\ 4. \end{array} \\ \begin{array}{cc} 1. & 5. \end{array} & \end{array}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}.$$

subdeterminanta reda 2

$$\begin{array}{cc} \begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{array}{c} 2. \\ 4. \end{array} \\ \begin{array}{cc} 1. & 5. \end{array} & \end{array}$$

subdeterminanta reda 3

$$\begin{array}{cc} \begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{array}{c} 1. \\ 2. \\ 3. \end{array} \\ \begin{array}{ccc} 1. & 3. & 4. \end{array} & \end{array}$$

subdeterminanta reda 4

Zadatak 1

Odredite rang matrice

$$A = \begin{array}{cc}
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} & \begin{matrix} 1. \\ 2. \\ 3. \\ 4. \end{matrix} \\
\begin{matrix} 1. & 2. & 3. & & 5. \end{matrix} &
\end{array}$$

subdeterminanta reda 2

$$\begin{array}{cc}
\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{matrix} 2. \\ 4. \end{matrix} \\
\begin{matrix} 1. & 5. \end{matrix} &
\end{array}$$

subdeterminanta reda 3

$$\begin{array}{cc}
\begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{matrix} 1. \\ 2. \\ 3. \end{matrix} \\
\begin{matrix} 1. & 3. & 4. \end{matrix} &
\end{array}$$

subdeterminanta reda 4

Zadatak 1

Odredite rang matrice

$$A = \begin{array}{cl} \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} & \begin{matrix} 1. \\ 2. \\ 3. \\ 4. \end{matrix} \\ \begin{matrix} \;1.\; & \;2.\; & \;3.\; & \;\;\; & \;5.\; \end{matrix} & \end{array}.$$

subdeterminanta reda 2

$$\begin{array}{cl} \begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{matrix} 2. \\ 4. \end{matrix} \\ \begin{matrix} 1. & 5. \end{matrix} & \end{array}$$

subdeterminanta reda 3

$$\begin{array}{cl} \begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{matrix} 1. \\ 2. \\ 3. \end{matrix} \\ \begin{matrix} 1. & 3. & 4. \end{matrix} & \end{array}$$

subdeterminanta reda 4

$$\begin{vmatrix} -4 & -3 & -4 & 0 \\ 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 2 \\ 11 & 9 & 11 & 4 \end{vmatrix}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{array}{cc} \begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} . & \begin{array}{c} 1. \\ 2. \\ 3. \\ 4. \end{array} \\ \begin{array}{ccccc} 1. & 2. & 3. & & 5. \end{array} & \end{array}$$

subdeterminanta reda 2

$$\begin{array}{cc} \begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{array}{c} 2. \\ 4. \end{array} \\ \begin{array}{cc} 1. & 5. \end{array} & \end{array}$$

subdeterminanta reda 3

$$\begin{array}{cc} \begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{array}{c} 1. \\ 2. \\ 3. \end{array} \\ \begin{array}{ccc} 1. & 3. & 4. \end{array} & \end{array}$$

subdeterminanta reda 4

$$\begin{array}{cc} \begin{vmatrix} -4 & -3 & -4 & 0 \\ 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 2 \\ 11 & 9 & 11 & 4 \end{vmatrix} & \begin{array}{c} 1. \\ 2. \\ 3. \\ 4. \end{array} \\ \begin{array}{cccc} 1. & 2. & 3. & 5. \end{array} & \end{array}$$

Zadatak 1

Odredite rang matrice

$$A = \begin{array}{cl}
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}. & \begin{array}{l} 1. \\ 2. \\ 3. \\ 4. \end{array} \\
\begin{array}{ccccc} 1. & 2. & 3. & 4. & 5. \end{array} &
\end{array}$$

subdeterminanta reda 2

$$\begin{array}{cl}
\begin{vmatrix} 1 & 3 \\ 11 & 4 \end{vmatrix} & \begin{array}{l} 2. \\ 4. \end{array} \\
\begin{array}{cc} 1. & 5. \end{array} &
\end{array}$$

subdeterminanta reda 3

$$\begin{array}{cl}
\begin{vmatrix} -4 & -4 & -1 \\ 1 & 1 & 1 \\ 14 & 14 & 5 \end{vmatrix} & \begin{array}{l} 1. \\ 2. \\ 3. \end{array} \\
\begin{array}{ccc} 1. & 3. & 4. \end{array} &
\end{array}$$

subdeterminanta reda 4

$$\begin{array}{cl}
\begin{vmatrix} -4 & -3 & -4 & 0 \\ 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 2 \\ 11 & 9 & 11 & 4 \end{vmatrix} & \begin{array}{l} 1. \\ 2. \\ 3. \\ 4. \end{array} \\
\begin{array}{cccc} 1. & 2. & 3. & 5. \end{array} &
\end{array}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} & & & & \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \\ + \\ \\ \\ \end{matrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14)$$

$+$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \\ + \\ + \\ \end{matrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ \end{matrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11)$$

$+ \quad + \quad +$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{array}{l} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11) \\ + \\ + \\ + \end{array} \sim$$

$$\sim \begin{bmatrix} & & & & \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \;/\cdot(-14)\;/\cdot(-11) \quad \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & \\ & & & & \end{bmatrix}$$

Rješenje

$$
\left[\begin{array}{rrrr|r} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{array}\right] \sim \left[\begin{array}{rrrr|r} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{array}\right] /\cdot 4 \;/\cdot(-14) \;/\cdot(-11) \sim
$$

$$
\sim \left[\begin{array}{rrrr|r} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ & & & & \end{array}\right]
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} / \cdot 4 \; / \cdot (-14) \; / \cdot (-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{array}{l} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{array} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \sim$$

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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \quad + \quad + \quad + \sim$$

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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \\ \\ \\ \end{matrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \\ + \\ \\ \end{matrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \, /\cdot 2$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \, /\cdot 2 \sim \begin{bmatrix} & & & & \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$
\begin{bmatrix}
-4 & -3 & -4 & -1 & 0 \\
1 & 1 & 1 & 1 & 3 \\
14 & 11 & 14 & 5 & 2 \\
11 & 9 & 11 & 5 & 4
\end{bmatrix}
\sim
\begin{bmatrix}
1 & 1 & 1 & 1 & 3 \\
-4 & -3 & -4 & -1 & 0 \\
14 & 11 & 14 & 5 & 2 \\
11 & 9 & 11 & 5 & 4
\end{bmatrix}
/\cdot 4 \; /\cdot(-14) \; /\cdot(-11)
\sim
$$

$$
\sim
\begin{bmatrix}
1 & 1 & 1 & 1 & 3 \\
0 & 1 & 0 & 3 & 12 \\
0 & -3 & 0 & -9 & -40 \\
0 & -2 & 0 & -6 & -29
\end{bmatrix}
/\cdot 3 \; /\cdot 2
\sim
\begin{bmatrix}
1 & 1 & 1 & 1 & 3 \\
 & & & & \\
 & & & & \\
 & & & &
\end{bmatrix}
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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11) \quad + \quad + \quad + \quad \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \,/\cdot 2 \quad + \quad + \quad \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ / \cdot 3 \, / \cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \;/\cdot(-14) \;/\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \;/\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \, /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ & & & & \end{bmatrix}$$

Rješenje

$$\left[\begin{array}{ccccc} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{array}\right] \sim \left[\begin{array}{ccccc} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{array}\right] /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \quad \sim$$

$$\sim \left[\begin{array}{ccccc} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{array}\right] /\cdot 3 \; /\cdot 2 \quad \sim \left[\begin{array}{ccccc} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & & & & \end{array}\right]$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \,/\cdot (-14) \,/\cdot (-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \,/\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \; /\cdot 2 \quad \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & & \end{bmatrix}$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\begin{array}{l} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{array}
\sim
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$$
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}
\begin{array}{l} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{array}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & \end{bmatrix}
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \,/\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \sim$$

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Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \quad \sim
$$

$$
\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \, /\cdot 2 \quad \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim
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\sim \begin{bmatrix} \quad \end{bmatrix}
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Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \ /\cdot(-14) \ /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \ /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} & & 3 & & \\ & & 12 & & \\ & & -4 & & \\ & & -5 & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} & & 3 & 1 \\ & & 12 & 0 \\ & & -4 & 0 \\ & & -5 & 0 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \; /\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 3 & 1 \\ 0 & 12 & 0 \\ 0 & -4 & 0 \\ 0 & -5 & 0 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \; /\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 \\ 0 & 1 & 12 & 0 \\ 0 & 0 & -4 & 0 \\ 0 & 0 & -5 & 0 \end{bmatrix}$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11)
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\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3\,/\cdot 2
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\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
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\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix}
$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\begin{matrix} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11) \\ + \\ + \\ + \end{matrix}
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\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}
\begin{matrix} \\ /\cdot 3\,/\cdot 2 \\ + \\ + \end{matrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
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\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix}
$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{array}{c} \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \end{array}
\begin{array}{l} /\cdot 4 \, /\cdot(-14) \, /\cdot(-11) \\ \\ \\ \\ \end{array}
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\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}
\begin{array}{l} \\ /\cdot 3 \, /\cdot 2 \\ \\ \\ \end{array}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix}
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \ /\cdot(-14) \ /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \ /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} /\cdot \frac{-5}{4}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix}$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} / \cdot 4 \, / \cdot (-14) \, / \cdot (-11)
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} / \cdot 3 \, / \cdot 2
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} / \cdot \frac{-5}{4}
\sim
\begin{bmatrix} \quad & \quad \end{bmatrix}
$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}
\begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix}
\begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix}
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ & & & & \\ & & & & \\ & & & & \end{bmatrix}
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ \\ \\ \\ \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ \\ \\ \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ \\ \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

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$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ & & & & \end{bmatrix}$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim
$$

$$
\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim
$$

$$
\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & & & & \end{bmatrix}
$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \quad + \quad + \end{matrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix}
\begin{matrix} /\cdot 3 \; /\cdot 2 \\ + \quad + \end{matrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix}
\begin{matrix} /\cdot \frac{-5}{4} \\ + \end{matrix}
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & & & \end{bmatrix}
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0\\ 1 & 1 & 1 & 1 & 3\\ 14 & 11 & 14 & 5 & 2\\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3\\ -4 & -3 & -4 & -1 & 0\\ 14 & 11 & 14 & 5 & 2\\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \; \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3\\ 0 & 1 & 0 & 3 & 12\\ 0 & -3 & 0 & -9 & -40\\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \; /\cdot 2 \quad \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3\\ 0 & 1 & 0 & 3 & 12\\ 0 & 0 & 0 & 0 & -4\\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1\\ 0 & 1 & 12 & 3 & 0\\ 0 & 0 & -4 & 0 & 0\\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} /\cdot \frac{-5}{4} \quad \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1\\ 0 & 1 & 12 & 3 & 0\\ 0 & 0 & -4 & 0 & 0\\ 0 & 0 & 0 & & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \; /\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} /\cdot \frac{-5}{4} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \,/\cdot(-14)\,/\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \,/\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \; /\cdot(-14) \; /\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \; /\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Rješenje

$$
\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix}
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} /\cdot 4 \ /\cdot(-14) \ /\cdot(-11)
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \ /\cdot 2
\sim
\begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix}
\sim
$$

$$
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} /\cdot \frac{-5}{4}
\sim
\begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}
$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \;/\cdot(-14)\;/\cdot(-11) \\ + \\ + \\ + \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} \begin{matrix} \\ /\cdot 3 \;/\cdot 2 \\ + \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} \begin{matrix} \\ \\ /\cdot \frac{-5}{4} \\ + \end{matrix} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \qquad \begin{vmatrix} 1 & 1 & 3 \\ 0 & 1 & 12 \\ 0 & 0 & -4 \end{vmatrix} \neq 0$$

Rješenje

$$\begin{bmatrix} -4 & -3 & -4 & -1 & 0 \\ 1 & 1 & 1 & 1 & 3 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ -4 & -3 & -4 & -1 & 0 \\ 14 & 11 & 14 & 5 & 2 \\ 11 & 9 & 11 & 5 & 4 \end{bmatrix} \begin{matrix} /\cdot 4 \ /\cdot(-14) \ /\cdot(-11) \end{matrix} \sim$$

$$\sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & -3 & 0 & -9 & -40 \\ 0 & -2 & 0 & -6 & -29 \end{bmatrix} /\cdot 3 \ /\cdot 2 \sim \begin{bmatrix} 1 & 1 & 1 & 1 & 3 \\ 0 & 1 & 0 & 3 & 12 \\ 0 & 0 & 0 & 0 & -4 \\ 0 & 0 & 0 & 0 & -5 \end{bmatrix} \sim$$

$$\boxed{r(A) = 3}$$

$$\sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & -5 & 0 & 0 \end{bmatrix} /\cdot \frac{-5}{4} \sim \begin{bmatrix} 1 & 1 & 3 & 1 & 1 \\ 0 & 1 & 12 & 3 & 0 \\ 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \qquad \begin{vmatrix} 1 & 1 & 3 \\ 0 & 1 & 12 \\ 0 & 0 & -4 \end{vmatrix} \neq 0$$

Broj parametara u rješivom sustavu

$$\boxed{\textbf{broj parametara}} = \boxed{\textbf{broj nepoznanica}} - \boxed{\textbf{broj nezavisnih jednadžbi}}$$

$$\boxed{\textbf{broj nezavisnih jednadžbi}} = \boxed{\textbf{rang proširene matrice sustava}} = \boxed{\textbf{rang matrice sustava}}$$

ako je sustav konzistentan

drugi zadatak

Zadatak 2

Zadan je sustav linearnih jednadžbi

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19. \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

a) *Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima zadani sustav.*

b) *Riješite zadani sustav Gaussovim postupkom.*

Rješenje

a)

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)
$$A = \begin{bmatrix} & & & \\ & & & \\ & & & \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ & & & \\ & & & \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)
$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ & & & \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \begin{bmatrix} \\ \\ \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \begin{bmatrix} 2 & 3 & 2 & 6 & \\ -2 & 3 & -6 & 12 & \\ 2 & 6 & 0 & 15 & \end{bmatrix}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & \\ -2 & 3 & -6 & 12 & \\ 2 & 6 & 0 & 15 & \end{array}\right]$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

Rješenje

a)

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1$$

Rješenje

a)

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] \begin{array}{l} / \cdot 1 \\ + \\ \end{array}$$

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Rješenje

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1)$$

+ +

Rješenje

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$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \quad \sim \quad \begin{bmatrix} & & & & \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \quad \sim \quad \begin{bmatrix} 2 & 3 & 2 & 6 & 1 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc|c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

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Rješenje

a)

$$A=\begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p=\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] \begin{array}{l} /\cdot 1 \;/\cdot(-1) \\ + \\ + \end{array} \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & & & & \\ & & & & \end{array}\right]$$

Rješenje

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Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

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Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 /\cdot (-1) \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & \\ & & & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \quad \sim \quad \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ & & & & \end{array}\right]$$

Rješenje

a)

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Rješenje

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Rješenje

a)

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc|c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

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Rješenje

a)

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$$\sim$$

Rješenje

a)

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \begin{bmatrix} 2 & 3 & 2 & 6 & 1 \\ & & & & \\ & & & & \end{bmatrix}$$

Rješenje

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$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 /\cdot (-1) \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

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$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ & & & & \end{array}\right]$$

Rješenje

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$$A=\begin{bmatrix}2&3&2&6\\-2&3&-6&12\\2&6&0&15\end{bmatrix}\qquad A_p=\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]$$

$$\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]/\cdot 1\,/\cdot(-1)\sim\left[\begin{array}{cccc:c}2&3&2&6&1\\0&6&-4&18&-18\\0&3&-2&9&-9\end{array}\right]\sim$$

$$\sim\left[\begin{array}{cccc:c}2&3&2&6&1\\0&3&-2&9&-9\\0&6&-4&18&-18\end{array}\right]$$

Rješenje

a)

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Rješenje

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Rješenje

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$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2)$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2)$$

Rješenje

a)

$$A=\begin{bmatrix}2 & 3 & 2 & 6\\ -2 & 3 & -6 & 12\\ 2 & 6 & 0 & 15\end{bmatrix} \qquad A_p=\left[\begin{array}{cccc:c}2 & 3 & 2 & 6 & 1\\ -2 & 3 & -6 & 12 & -19\\ 2 & 6 & 0 & 15 & -8\end{array}\right]$$

$$\left[\begin{array}{cccc:c}2 & 3 & 2 & 6 & 1\\ -2 & 3 & -6 & 12 & -19\\ 2 & 6 & 0 & 15 & -8\end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c}2 & 3 & 2 & 6 & 1\\ 0 & 6 & -4 & 18 & -18\\ 0 & 3 & -2 & 9 & -9\end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c}2 & 3 & 2 & 6 & 1\\ 0 & 3 & -2 & 9 & -9\\ 0 & 6 & -4 & 18 & -18\end{array}\right] / \cdot (-2) \sim \left[\begin{array}{c} \\ \\ \\ \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccccc} 2 & 3 & 2 & 6 & 1 \\ & & & & \\ & & & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ & & & & \\ & & & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ & & & & \end{array}\right]$$

Rješenje

a)

$$A=\begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p=\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 \,/\cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] /\cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & & & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \; + \; + \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \; + \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 /\cdot(-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] /\cdot(-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Rješenje

a)

$$A=\begin{bmatrix}2&3&2&6\\-2&3&-6&12\\2&6&0&15\end{bmatrix}\qquad A_p=\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]$$

$$\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]/\cdot 1\,/\cdot(-1)\ \sim\ \left[\begin{array}{cccc:c}2&3&2&6&1\\0&6&-4&18&-18\\0&3&-2&9&-9\end{array}\right]\ \sim$$

$$\sim\ \left[\begin{array}{cccc:c}2&3&2&6&1\\0&3&-2&9&-9\\0&6&-4&18&-18\end{array}\right]/\cdot(-2)\ \sim\ \left[\begin{array}{cccc:c}2&3&2&6&\\0&3&-2&9&\text{[redacted]}\\0&0&0&0&\end{array}\right]$$

Rješenje

a)

$$A=\begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p=\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & \text{[redacted]} \\ 0 & 3 & -2 & 9 & \\ 0 & 0 & 0 & 0 & \end{array}\right]$$

$$r(A) =$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \; / \cdot (-1) \quad + \quad + \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \quad + \quad \sim \left[\begin{array}{cccc:c} \boxed{\begin{matrix} 2 & 3 \\ 0 & 3 \end{matrix}} & & 2 & 6 & \\ & & -2 & 9 & \text{[redacted]} \\ 0 & 0 & 0 & 0 & \end{array}\right]$$

$$r(A) =$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & \\ 0 & 3 & -2 & 9 & \text{[redacted]} \\ 0 & 0 & 0 & 0 & \end{array}\right]$$

$$r(A) = 2$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 \,/\cdot (-1) \quad + \quad + \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] /\cdot (-2) \quad + \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & \\ 0 & 3 & -2 & 9 & \text{[redacted]} \\ 0 & 0 & 0 & 0 & \end{array}\right]$$

$$\boxed{r(A) = 2}$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 / \cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

Rješenje

a)

$$A=\begin{bmatrix}2&3&2&6\\-2&3&-6&12\\2&6&0&15\end{bmatrix}\qquad A_p=\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]$$

$$\left[\begin{array}{cccc:c}2&3&2&6&1\\-2&3&-6&12&-19\\2&6&0&15&-8\end{array}\right]/\cdot 1\,/\cdot(-1) \sim \left[\begin{array}{cccc:c}2&3&2&6&1\\0&6&-4&18&-18\\0&3&-2&9&-9\end{array}\right]\sim$$

$$\sim\left[\begin{array}{cccc:c}2&3&2&6&1\\0&3&-2&9&-9\\0&6&-4&18&-18\end{array}\right]/\cdot(-2)\sim\left[\begin{array}{cccc:c}2&3&2&6&1\\0&3&-2&9&-9\\0&0&0&0&0\end{array}\right]$$

$$\boxed{r(A)=2}\qquad r(A_p)=$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] / \cdot 1 \, / \cdot (-1) \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) = 2$$

Rješenje

a)

$$A = \begin{bmatrix} 2 & 3 & 2 & 6 \\ -2 & 3 & -6 & 12 \\ 2 & 6 & 0 & 15 \end{bmatrix} \qquad A_p = \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ -2 & 3 & -6 & 12 & -19 \\ 2 & 6 & 0 & 15 & -8 \end{array}\right] /\cdot 1 /\cdot (-1) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 6 & -4 & 18 & -18 \\ 0 & 3 & -2 & 9 & -9 \end{array}\right] \sim$$

$$\sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 6 & -4 & 18 & -18 \end{array}\right] /\cdot (-2) \sim \left[\begin{array}{cccc:c} 2 & 3 & 2 & 6 & 1 \\ 0 & 3 & -2 & 9 & -9 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad \boxed{r(A_p) = 2}$$

$$r(A) = r(A_p) = 2$$

$$r(A) = r(A_p) = 2$$

zadani sustav
ima rješenje

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav
ima rješenje

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav
ima rješenje

zadani sustav ima
beskonačno mnogo rješenja

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav ima rješenje

zadani sustav ima beskonačno mnogo rješenja

b) $\boxed{\text{broj parametara u općem rješenju}}$

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav ima rješenje

zadani sustav ima beskonačno mnogo rješenja

b) broj parametara u općem rješenju

$$\text{broj parametara} = \text{broj nepoznanica} - r(A)$$

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav
ima rješenje

zadani sustav ima
beskonačno mnogo rješenja

b) $\boxed{\text{broj parametara u općem rješenju}}$

$$\text{broj parametara} = \text{broj nepoznanica} - r(A)$$

$$\text{broj parametara} = 4 - 2$$

$$r(A) = r(A_p) = 2 < \text{broj nepoznanica}$$

zadani sustav
ima rješenje

zadani sustav ima
beskonačno mnogo rješenja

b) broj parametara u općem rješenju

$$\text{broj parametara} = \text{broj nepoznanica} - r(A)$$

$$\text{broj parametara} = 4 - 2$$

$$\text{broj parametara} = 2$$

x_1	x_2	x_3	x_4	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4	
2	3	2	6	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
2	3	2	6	1

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19
2	6	0	15	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19
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$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
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x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19
2	6	0	15	-8

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/ \cdot 1$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1 \;/\cdot (-1)$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/ \cdot 1 \; / \cdot (-1)$
2	6	0	15	-8	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0					
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{array}{cccc|cl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \ /\cdot (-1) \\
\hline
 & & & & & \\
0 & 9 & & & & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{array}{cccc|c}
x_1 & x_2 & x_3 & x_4 & \\
\hline
2 & 3 & 2 & 6 & 1 \\
-2 & 3 & -6 & 12 & -19 \\
2 & 6 & 0 & 15 & -8 \quad / \cdot 1 \; / \cdot (-1) \\
\hline
 & & & & \\
0 & 9 & -6 & & \\
2 & 6 & 0 & 15 & -8
\end{array}
$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	9	-6	27		
2	6	0	15	-8	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19
2	6	0	15	-8
0	9	-6	27	-27
2	6	0	15	-8

$+$ $+$

$/\cdot 1$ $/\cdot(-1)$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0					
0	9	-6	27	-27	
2	6	0	15	-8	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

$$
\begin{array}{cccc|cl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & / \cdot 1 \ / \cdot (-1) \\
\hline
0 & -3 & & & & \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/ \cdot 1 \; / \cdot (-1)$
0	-3	2			
0	9	-6	27	-27	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9		
0	9	-6	27	-27	
2	6	0	15	-8	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/ \cdot 1 \; / \cdot (-1)$
0	-3	2	-9	9	
0	9	-6	27	-27	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/ \cdot 1 \; / \cdot (-1)$
0	-3	2	-9	9	
0	9	-6	27	-27	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1\\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19\\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4	
2	3	2	6	1
-2	3	-6	12	-19
2	6	0	15	-8
0	-3	2	-9	9
0	9	-6	27	-27
2	6	0	15	-8

$+$ $+$

$/ \cdot 1$ $/ \cdot (-1)$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1\\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19\\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1 \;/\cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0					

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1 \; /\cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0				

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
−2	3	−6	12	−19	
2	6	0	15	−8	$/\cdot 1$ $/\cdot(-1)$
0	−3	2	−9	9	$/\cdot 3$
0	9	−6	27	−27	
2	6	0	15	−8	
0	−3	2	−9	9	
0	0	0			

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{array}{cccc|cl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \;/\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & & \\
\end{array}
$$

+ +

+

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/ \cdot 1$ $/ \cdot (-1)$
0	-3	2	-9	9	$/ \cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1 \;/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1 \;/\cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1 \;/\cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	+
−2	3	−6	12	−19	+
2	6	0	15	−8	$/\cdot 1\ /\cdot(-1)$
0	−3	2	−9	9	$/\cdot 3$
0	9	−6	27	−27	+
2	6	0	15	−8	
0	−3	2	−9	9	
0	0	0	0	0	
2	6	0	15	−8	
0	−3	2	−9	9	
2	6	0	15	−8	

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1\\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19\\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
−2	3	−6	12	−19	
2	6	0	15	−8	$/\cdot 1$ $/\cdot(-1)$
0	−3	2	−9	9	$/\cdot 3$
0	9	−6	27	−27	
2	6	0	15	−8	
0	−3	2	−9	9	
0	0	0	0	0	
2	6	0	15	−8	
0	−3	2	−9	9	
2	6	0	15	−8	

$-3x_2$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{array}{rrrr|rl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \;/\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$-3x_2 + 2x_3$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{array}{cccc|cl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot (-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$-3x_2 + 2x_3 - 9x_4$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/ \cdot 1 \; / \cdot (-1)$
0	-3	2	-9	9	$/ \cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$2x_1$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

$$
\begin{array}{cccc|cl}
x_1 & x_2 & x_3 & x_4 & & \\
\hline
2 & 3 & 2 & 6 & 1 & + \\
-2 & 3 & -6 & 12 & -19 & + \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & + \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_1 + 6x_2$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
−2	3	−6	12	−19	
2	6	0	15	−8	$/\cdot 1 \;/\cdot(-1)$

0	−3	2	−9	9	$/\cdot 3$
0	9	−6	27	−27	
2	6	0	15	−8	

0	−3	2	−9	9
0	0	0	0	0
2	6	0	15	−8

0	−3	2	−9	9
2	6	0	15	−8

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_1 + 6x_2 + 15x_4$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1 \; /\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$
\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	x_2	x_3	x_4		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$\begin{aligned} 2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\ -2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}$$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & + \\
-2 & 3 & -6 & 12 & -19 & + \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \ /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & + \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.
\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
\right\}
$$

$$
\begin{aligned}
2x_1 + 3x_2 + 2x_3 + 6x_4 &= 1 \\
-2x_1 + 3x_2 - 6x_3 + 12x_4 &= -19 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\ \hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \;\; /\cdot(-1) \\ \hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}$$

$$\left.\begin{array}{r}
-3x_2 + 2x_3 - 9x_4 = 9 \\
2x_1 + 6x_2 + 15x_4 = -8
\end{array}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 =$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1 \; / \cdot (-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$x_3 =$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4$$

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	$+$
-2	3	-6	12	-19	$+$
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	$+$
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\ \hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \ /\cdot (-1) \\ \hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}$$

$$\left.\begin{array}{r} -3x_2 + 2x_3 - 9x_4 = 9 \\ 2x_1 + 6x_2 + 15x_4 = -8 \end{array}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 =$$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\ \hline
2 & 3 & 2 & 6 & 1 & + \\
-2 & 3 & -6 & 12 & -19 & + \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot (-1) \\ \hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & + \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\ \hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.\begin{array}{r}
-3x_2 + 2x_3 - 9x_4 = 9 \\
2x_1 + 6x_2 + 15x_4 = -8
\end{array}\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$
\begin{array}{rrrr|r l}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & / \cdot 1 \; / \cdot (-1) \\
\hline
0 & -3 & 2 & -9 & 9 & / \cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.
\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$x_1 =$$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot (-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.
\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}
\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$x_1 = -4 - 3x_2 - \frac{15}{2}x_4$$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.\begin{array}{r}
-3x_2 + 2x_3 - 9x_4 = 9 \\
2x_1 + 6x_2 + 15x_4 = -8
\end{array}\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

x_1	$\boxed{x_2}$	x_3	$\boxed{x_4}$		
2	3	2	6	1	
-2	3	-6	12	-19	
2	6	0	15	-8	$/\cdot 1$ $/\cdot(-1)$
0	-3	2	-9	9	$/\cdot 3$
0	9	-6	27	-27	
2	6	0	15	-8	
0	-3	2	-9	9	
0	0	0	0	0	
2	6	0	15	-8	
0	-3	2	-9	9	
2	6	0	15	-8	

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$$\begin{array}{rrrr|r}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & \\
\hline
2 & 3 & 2 & 6 & 1 \\
-2 & 3 & -6 & 12 & -19 \\
2 & 6 & 0 & 15 & -8 \\
\hline
0 & -3 & 2 & -9 & 9 \\
0 & 9 & -6 & 27 & -27 \\
2 & 6 & 0 & 15 & -8 \\
\hline
0 & -3 & 2 & -9 & 9 \\
0 & 0 & 0 & 0 & 0 \\
2 & 6 & 0 & 15 & -8 \\
\hline
0 & -3 & 2 & -9 & 9 \\
2 & 6 & 0 & 15 & -8
\end{array}$$

$/\cdot 1 \; / \cdot (-1)$ $+$ $+$

$/\cdot 3$ $+$

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$x_1 =$

$x_2 =$

$x_3 =$

$x_4 =$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \;/\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$\left.\begin{aligned} -3x_2 + 2x_3 - 9x_4 &= 9 \\ 2x_1 + 6x_2 + 15x_4 &= -8 \end{aligned}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$x_1 =$

$x_2 = u$

$x_3 =$

$x_4 =$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & + \\
-2 & 3 & -6 & 12 & -19 & + \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \ /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & + \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$x_1 =$

$x_2 = u$

$x_3 =$

$x_4 = v$

$$\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \ /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}$$

$$\left.\begin{array}{r} -3x_2 + 2x_3 - 9x_4 = 9 \\ 2x_1 + 6x_2 + 15x_4 = -8 \end{array}\right\}$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$$x_1 = -4 - 3u - \frac{15}{2}v$$

$$x_2 = u$$

$$x_3 =$$

$$x_4 = v$$

$$
\begin{array}{cccc|cl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \; /\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$$
\begin{aligned}
x_1 &= -4 - 3u - \frac{15}{2}v \\
x_2 &= u \\
x_3 &= \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v \\
x_4 &= v
\end{aligned}
$$

$$
\begin{array}{rrrr|rl}
x_1 & \boxed{x_2} & x_3 & \boxed{x_4} & & \\
\hline
2 & 3 & 2 & 6 & 1 & \\
-2 & 3 & -6 & 12 & -19 & \\
2 & 6 & 0 & 15 & -8 & /\cdot 1 \;/\cdot(-1) \\
\hline
0 & -3 & 2 & -9 & 9 & /\cdot 3 \\
0 & 9 & -6 & 27 & -27 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
0 & 0 & 0 & 0 & 0 & \\
2 & 6 & 0 & 15 & -8 & \\
\hline
0 & -3 & 2 & -9 & 9 & \\
2 & 6 & 0 & 15 & -8 &
\end{array}
$$

$$
\left.\begin{aligned}
-3x_2 + 2x_3 - 9x_4 &= 9 \\
2x_1 + 6x_2 + 15x_4 &= -8
\end{aligned}\right\}
$$

$$-3x_2 + 2x_3 - 9x_4 = 9$$

$$2x_3 = 9 + 3x_2 + 9x_4$$

$$\boxed{x_3 = \frac{9}{2} + \frac{3}{2}x_2 + \frac{9}{2}x_4}$$

$$2x_1 + 6x_2 + 15x_4 = -8$$

$$2x_1 = -8 - 6x_2 - 15x_4$$

$$\boxed{x_1 = -4 - 3x_2 - \frac{15}{2}x_4}$$

Opće rješenje sustava

$$
\begin{aligned}
x_1 &= -4 - 3u - \frac{15}{2}v \\
x_2 &= u \\
x_3 &= \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v \\
x_4 &= v
\end{aligned}
\qquad u, v \in \mathbb{R}
$$

Neka posebna rješenja

$$x_1 = -4 - 3u - \frac{15}{2}v$$
$$x_2 = u$$
$$x_3 = \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v$$
$$x_4 = v$$

$$\begin{aligned} x_1 &= -4 - 3u - \frac{15}{2}v \\ x_2 &= u \\ x_3 &= \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v \\ x_4 &= v \end{aligned}$$

Neka posebna rješenja

- bazično rješenje: $u = 0, \; v = 0$

$$x_1 = -4, \; x_2 = 0, \; x_3 = \frac{9}{2}, \; x_4 = 0$$

$$\begin{aligned} x_1 &= -4 - 3u - \frac{15}{2}v \\ x_2 &= u \\ x_3 &= \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v \\ x_4 &= v \end{aligned}$$

Neka posebna rješenja

- bazično rješenje: $u = 0,\ v = 0$

$$x_1 = -4,\ x_2 = 0,\ x_3 = \frac{9}{2},\ x_4 = 0$$

- $u = 0,\ v = 1$

$$x_1 = -\frac{23}{2},\ x_2 = 0,\ x_3 = 9,\ x_4 = 1$$

$$\begin{aligned} x_1 &= -4 - 3u - \frac{15}{2}v \\ x_2 &= u \\ x_3 &= \frac{9}{2} + \frac{3}{2}u + \frac{9}{2}v \\ x_4 &= v \end{aligned}$$

Neka posebna rješenja

- bazično rješenje: $u = 0,\ v = 0$

$$x_1 = -4,\ x_2 = 0,\ x_3 = \frac{9}{2},\ x_4 = 0$$

- $u = 0,\ v = 1$

$$x_1 = -\frac{23}{2},\ x_2 = 0,\ x_3 = 9,\ x_4 = 1$$

- $u = \sqrt{2},\ v = \pi$

$$x_1 = -4 - 3\sqrt{2} - \frac{15}{2}\pi,\quad x_2 = \sqrt{2},\quad x_3 = \frac{9}{2} + \frac{3}{2}\sqrt{2} + \frac{9}{2}\pi,\quad x_4 = \pi$$

treći zadatak

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ & & \\ & & \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ & & \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ 2 & 7 & 0 \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ 2 & 7 & 0 \end{bmatrix} \qquad A_p = \begin{bmatrix} & & & \\ & & & \\ & & & \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ 2 & 7 & 0 \end{bmatrix} \qquad A_p = \begin{bmatrix} 1 & -4 & 5 & \\ 0 & -3 & 2 & \\ 2 & 7 & 0 & \end{bmatrix}$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ 2 & 7 & 0 \end{bmatrix} \qquad A_p = \left[\begin{array}{ccc:c} 1 & -4 & 5 & \\ 0 & -3 & 2 & \\ 2 & 7 & 0 & \end{array}\right]$$

Zadatak 3

Pomoću Kronecker-Capellijevog teorema ispitajte koliko rješenja ima sustav linearnih jednadžbi

$$\begin{aligned} x_1 - 4x_2 + 5x_3 &= 6 \\ -3x_2 + 2x_3 &= -12. \\ 2x_1 + 7x_2 &= 35 \end{aligned}$$

Rješenje

$$A = \begin{bmatrix} 1 & -4 & 5 \\ 0 & -3 & 2 \\ 2 & 7 & 0 \end{bmatrix} \qquad A_p = \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2)$$

$$
\begin{array}{l}
\left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
0 & -3 & 2 & -12 \\
2 & 7 & 0 & 35
\end{array}\right]
\end{array}
\begin{array}{l}
/\cdot(-2) \\
\\
\quad + \\
\end{array}
$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \quad \left[\begin{array}{cccc} & & & \\ & & & \\ & & & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} / \cdot (-2) \\ \\ \xleftarrow{+} \end{array} \sim \left[\begin{array}{cccc} 1 & -4 & 5 & 6 \\ & & & \\ & & & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] /\cdot(-2) \overset{+}{\curvearrowright} \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ & & & \\ & & & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ & & & \end{array}\right]$$

$+$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & & & \end{array}\right]$$

$+$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} / \cdot (-2) \\ \\ \xleftarrow{+} \end{array} \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} /\cdot(-2) \\ \\ \xleftarrow{+} \end{array} \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \xrightarrow{+} \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad + \quad \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \; \sim \; \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right]$$

$+$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} / \cdot (-2) \\ \\ {}^{+} \end{array} \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] \begin{array}{l} \\ / \cdot 5 \\ \\ \end{array}$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{c} \\ \\ \\ \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} /\cdot(-2) \\ \\ \quad + \end{array} \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] \begin{array}{l} \\ /\cdot 5 \\ \quad + \end{array} \sim$$

$$\sim \left[\begin{array}{cccc} 1 & -4 & 5 & 6 \\ & & & \\ & & & \end{array}\right]$$

$$
\left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
0 & -3 & 2 & -12 \\
2 & 7 & 0 & 35
\end{array}\right] / \cdot (-2)
\sim
\left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
0 & -3 & 2 & -12 \\
0 & 15 & -10 & 23
\end{array}\right] / \cdot 5
\sim
$$

$$
\sim \left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
 & & & \\
 & & &
\end{array}\right]
$$

$$
\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim
$$

$+$ $+$

$$
\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ & & & \end{array}\right]
$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & & & \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} /\cdot(-2) \\ \\ \\ \end{array} \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] \begin{array}{l} \\ /\cdot 5 \\ \\ \end{array} \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & & \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]\begin{array}{l} / \cdot (-2) \\ \\ + \end{array} \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right]\begin{array}{l} \\ / \cdot 5 \\ + \end{array} \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & \\ 0 & -3 & 2 & \\ 0 & 0 & 0 & \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] /\cdot(-2) \quad \sim \quad \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] /\cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & \\ 0 & -3 & 2 & \text{[redacted]} \\ 0 & 0 & 0 & \end{array}\right]$$

$$r(A) =$$

$$
\left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
0 & -3 & 2 & -12 \\
2 & 7 & 0 & 35
\end{array}\right]
\begin{array}{l} / \cdot (-2) \\ \\ + \end{array}
\sim
\left[\begin{array}{ccc:c}
1 & -4 & 5 & 6 \\
0 & -3 & 2 & -12 \\
0 & 15 & -10 & 23
\end{array}\right]
\begin{array}{l} \\ / \cdot 5 \\ + \end{array}
\sim
$$

$$
\sim
\left[\begin{array}{ccc:c}
1 & -4 & 5 & \\
0 & -3 & 2 & \\
0 & 0 & 0 &
\end{array}\right]
$$

$$
r(A) =
$$

$$
\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} /\cdot(-2) \\ \\ + \end{array}
\sim
\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] \begin{array}{l} \\ /\cdot 5 \\ + \end{array}
\sim
$$

$$
\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & \\ 0 & -3 & 2 & \text{[redacted]} \\ 0 & 0 & 0 & \end{array}\right]
$$

$$
r(A) = 2
$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right]\begin{array}{l} /\cdot(-2) \\ \\ + \end{array} \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right]\begin{array}{l} \\ /\cdot 5 \\ + \end{array} \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & \text{[redacted]} \\ 0 & -3 & 2 & \\ 0 & 0 & 0 & \end{array}\right]$$

$$\boxed{r(A) = 2}$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \quad \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$+$ $+$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} & & & \\ & & & \\ & & & \end{array}\right]$$

$\boxed{r(A) = 2}$ $\qquad r(A_p) =$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc:c} \boxed{\begin{matrix} 1 & -4 \\ 0 & -3 \end{matrix}} & & 5 & 6 \\ & & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} & & 6 & \\ & & -12 & \\ & & -37 & \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad\qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} & & 6 & 5 \\ & & -12 & 2 \\ & & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad\qquad r(A_p) =$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad + \quad \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad + \quad \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{cc|c} 1 & 6 & 5 \\ 0 & -12 & 2 \\ 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad\qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} \boxed{\begin{array}{cc} 1 & -4 \\ 0 & -3 \end{array}} & & 5 & 6 \\ & & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] \begin{array}{l} / \cdot (-2) \\ \\ + \end{array} \sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] \begin{array}{l} \\ / \cdot 5 \\ + \end{array} \sim$$

$$\sim \left[\begin{array}{ccc|c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) =$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \quad \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \quad \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad r(A_p) = 3$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad \boxed{r(A_p) = 3}$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad \boxed{r(A_p) = 3}$$

$$r(A) \neq r(A_p)$$

$$\left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 2 & 7 & 0 & 35 \end{array}\right] / \cdot (-2) \sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 15 & -10 & 23 \end{array}\right] / \cdot 5 \sim$$

$$\sim \left[\begin{array}{ccc:c} 1 & -4 & 5 & 6 \\ 0 & -3 & 2 & -12 \\ 0 & 0 & 0 & -37 \end{array}\right] \sim \left[\begin{array}{ccc:c} 1 & -4 & 6 & 5 \\ 0 & -3 & -12 & 2 \\ 0 & 0 & -37 & 0 \end{array}\right]$$

$$\boxed{r(A) = 2} \qquad \boxed{r(A_p) = 3}$$

$r(A) \neq r(A_p) \longrightarrow$ zadani sustav je kontradiktoran

četvrti zadatak

Zadatak 4

Zadan je homogeni sustav linearnih jednadžbi

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0. \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) *Odredite sve vrijednosti parametra $a \in \mathbb{R}$ za koje sustav ima i netrivijalnih rješenja.*

b) *Za sve pronađene vrijednosti parametra $a \in \mathbb{R}$ iz a) dijela zadatka riješite pripadni sustav jednadžbi.*

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0 \\
-x_1 + x_2 + 4x_3 &= 0 \\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|c} 6 & -4 & 1 & 6 \\ -1 & 1 & 4 & -1 \\ 4 & -2 & a & 4 \end{array}\right|$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{array}\right| \begin{array}{cc} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{array} =$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$= 6 \cdot 1 \cdot a$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

a) Roucheov teorem

$$
\left|\begin{array}{ccc} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{array}\right| \begin{array}{cc} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{array} =
$$

$$= 6 \cdot 1 \cdot a$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

a) $\boxed{\text{Roucheov teorem}}$

$$
\left|\begin{array}{ccc|cc}
6 & -4 & 1 & 6 & -4\\
-1 & 1 & 4 & -1 & 1\\
4 & -2 & a & 4 & -2
\end{array}\right. =
$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{matrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{matrix}\right|\begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2)$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

a) Roucheov teorem

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2)$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

$$6x_1 - 4x_2 + x_3 = 0$$
$$-x_1 + x_2 + 4x_3 = 0$$
$$4x_1 - 2x_2 + ax_3 = 0$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$\begin{vmatrix} 6 & -4 & 1 \\ -1 & 1 & 4 \\ 4 & -2 & a \end{vmatrix} \begin{matrix} 6 & -4 \\ -1 & 1 \\ 4 & -2 \end{matrix} =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

Rješenje

$$6x_1 - 4x_2 + x_3 = 0$$
$$-x_1 + x_2 + 4x_3 = 0$$
$$4x_1 - 2x_2 + ax_3 = 0$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4)$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64$$

Rješenje

a) Roucheov teorem

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$6x_1 - 4x_2 + x_3 = 0$$
$$-x_1 + x_2 + 4x_3 = 0$$
$$4x_1 - 2x_2 + ax_3 = 0$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2$$

Rješenje

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

a) $\boxed{\text{Roucheov teorem}}$

$$
\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =
$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48$$

Rješenje

a) $\boxed{\text{Roucheov teorem}}$

$$6x_1 - 4x_2 + x_3 = 0$$
$$-x_1 + x_2 + 4x_3 = 0$$
$$4x_1 - 2x_2 + ax_3 = 0$$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a$$

Rješenje

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

a) Roucheov teorem

$$
\left|\begin{array}{ccc|cc}
6 & -4 & 1 & 6 & -4\\
-1 & 1 & 4 & -1 & 1\\
4 & -2 & a & 4 & -2
\end{array}\right. =
$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a =$$

Rješenje

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

a) Roucheov teorem

$$
\left|\begin{array}{ccc|cc}
6 & -4 & 1 & 6 & -4\\
-1 & 1 & 4 & -1 & 1\\
4 & -2 & a & 4 & -2
\end{array}\right. =
$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

$$2a - 18 = 0$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) $\boxed{\text{Roucheov teorem}}$

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

$$2a - 18 = 0$$

$$a = 9$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) Roucheov teorem

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

$$2a - 18 = 0$$

$$\boxed{a = 9}$$

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) Roucheov teorem

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

$$2a - 18 = 0$$

$$\boxed{a = 9}$$

- Za $a = 9$ pripadni homogeni sustav ima i netrivijalnih rješenja.

Rješenje

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

a) Roucheov teorem

$$\left|\begin{array}{ccc|cc} 6 & -4 & 1 & 6 & -4 \\ -1 & 1 & 4 & -1 & 1 \\ 4 & -2 & a & 4 & -2 \end{array}\right. =$$

$$= 6 \cdot 1 \cdot a + (-4) \cdot 4 \cdot 4 + 1 \cdot (-1) \cdot (-2) -$$

$$- 4 \cdot 1 \cdot 1 - (-2) \cdot 4 \cdot 6 - a \cdot (-1) \cdot (-4) =$$

$$= 6a - 64 + 2 - 4 + 48 - 4a = 2a - 18$$

$$2a - 18 = 0$$

$$\boxed{a = 9}$$

- Za $a = 9$ pripadni homogeni sustav ima i netrivijalnih rješenja.
- Za $a \in \mathbb{R} \setminus \{9\}$ pripadni homogeni sustav ima samo trivijalno rješenje.

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	0

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	0
-1	1	4	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	0
-1	1	4	0

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	0
-1	1	4	0
4	-2	9	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	-4	1	0
-1	1	4	0
4	-2	9	0

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

x_1	x_2	x_3	
6	-4	1	0
-1	1	4	0
4	-2	9	0

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3	
6	−4	1	0
−1	1	4	0
4	−2	9	0

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	
−1	1	4	0	$/ \cdot 6$
4	−2	9	0	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6$
4	−2	9	0	

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl} x_1 & x_2 & x_3 & & \\ \hline 6 & -4 & 1 & 0 & \quad + \\ -1 & 1 & 4 & 0 & /\cdot 6 \,/\cdot 4 \\ 4 & -2 & 9 & 0 & \\ \hline \end{array}$$

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	-4	1	0	$+$
-1	1	4	0	$/\cdot 6\ /\cdot 4$
4	-2	9	0	$+$

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6 \; / \cdot 4$
4	−2	9	0	+
−1	1	4	0	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6 \ / \cdot 4$
4	−2	9	0	+
0				
−1	1	4	0	

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|c} x_1 & x_2 & x_3 & \\ \hline 6 & -4 & 1 & 0 \\ -1 & 1 & 4 & 0 \\ 4 & -2 & 9 & 0 \\ \hline 0 & 2 & & \\ -1 & 1 & 4 & 0 \end{array}$$

$/ \cdot 6 \; / \cdot 4$

$+$

$+$

b)

$\boxed{a = 9}$

$$6x_1 - 4x_2 + x_3 = 0$$
$$-x_1 + x_2 + 4x_3 = 0$$
$$4x_1 - 2x_2 + ax_3 = 0$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6 \;/ \cdot 4$
4	−2	9	0	+
0	2	25		
−1	1	4	0	

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl} x_1 & x_2 & x_3 & & \\ \hline 6 & -4 & 1 & 0 & + \\ -1 & 1 & 4 & 0 & / \cdot 6 \; / \cdot 4 \\ 4 & -2 & 9 & 0 & + \\ \hline 0 & 2 & 25 & 0 & \\ -1 & 1 & 4 & 0 & \end{array}$$

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/\cdot 6$ $/\cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0				

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl}
x_1 & x_2 & x_3 & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & /\cdot 6 \; /\cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & & &
\end{array}$$

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0 \\
-x_1 + x_2 + 4x_3 &= 0 \\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

$$
\begin{array}{ccc|c}
x_1 & x_2 & x_3 & \\
\hline
6 & -4 & 1 & 0 \\
-1 & 1 & 4 & 0 \\
4 & -2 & 9 & 0 \\
\hline
0 & 2 & 25 & 0 \\
-1 & 1 & 4 & 0 \\
0 & 2 & 25 &
\end{array}
$$

$/ \cdot 6 \; / \cdot 4$

$+$ $+$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl} x_1 & x_2 & x_3 & & \\ \hline 6 & -4 & 1 & 0 & + \\ -1 & 1 & 4 & 0 & / \cdot 6 \ / \cdot 4 \\ 4 & -2 & 9 & 0 & + \\ \hline 0 & 2 & 25 & 0 & \\ -1 & 1 & 4 & 0 & \\ 0 & 2 & 25 & 0 & \end{array}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/\cdot 6 \; / \cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0 \\
-x_1 + x_2 + 4x_3 &= 0 \\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6 \; / \cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	-4	1	0	$+$
-1	1	4	0	$/\cdot 6 \; /\cdot 4$
4	-2	9	0	$+$
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	
-1	1	4	0	

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0 \\
-x_1 + x_2 + 4x_3 &= 0 \\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

x_1	x_2	x_3		
6	-4	1	0	
-1	1	4	0	$/ \cdot 6 \; / \cdot 4$
4	-2	9	0	
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	
-1	1	4	0	

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl} x_1 & x_2 & x_3 & & \\ \hline 6 & -4 & 1 & 0 & + \\ -1 & 1 & 4 & 0 & / \cdot 6 \; / \cdot 4 \\ 4 & -2 & 9 & 0 & + \\ \hline 0 & 2 & 25 & 0 & \\ -1 & 1 & 4 & 0 & \\ 0 & 2 & 25 & 0 & \\ \hline 0 & 2 & 25 & 0 & \\ -1 & 1 & 4 & 0 & \\ \hline \end{array}$$

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

$$
\begin{array}{ccc|cl}
x_1 & x_2 & x_3 & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & /\cdot 6\ /\cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & 25 & 0 & \\
\hline
0 & 2 & 25 & 0 & /\cdot \frac{-1}{2} \\
-1 & 1 & 4 & 0 & \\
\hline
\end{array}
$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6 \; / \cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	$/ \cdot \frac{-1}{2}$
−1	1	4	0	+

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/\cdot 6\ /\cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
−1	1	4	0	+
0	2	25	0	

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	-4	1	0	+
-1	1	4	0	$/\cdot 6 \;/\cdot 4$
4	-2	9	0	+
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
-1	1	4	0	+
0	2	25	0	
-1				

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl}
x_1 & x_2 & x_3 & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & / \cdot 6 \; / \cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & 25 & 0 & \\
\hline
0 & 2 & 25 & 0 & / \cdot \frac{-1}{2} \\
-1 & 1 & 4 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 0 & & &
\end{array}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl}
x_1 & x_2 & x_3 & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & /\cdot 6\ /\cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & 25 & 0 & \\
\hline
0 & 2 & 25 & 0 & /\cdot \frac{-1}{2} \\
-1 & 1 & 4 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 0 & -\frac{17}{2} & &
\end{array}$$

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/\cdot 6 \;/\cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
−1	1	4	0	+
0	2	25	0	
−1	0	$-\frac{17}{2}$	0	

b)

$\boxed{a = 9}$

$$
\begin{aligned}
6x_1 - 4x_2 + x_3 &= 0\\
-x_1 + x_2 + 4x_3 &= 0\\
4x_1 - 2x_2 + ax_3 &= 0
\end{aligned}
$$

x_1	x_2	x_3		
6	−4	1	0	+
−1	1	4	0	$/ \cdot 6$ $/ \cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	$/ \cdot \frac{-1}{2}$
−1	1	4	0	+
0	2	25	0	
−1	0	$-\frac{17}{2}$	0	

$$2x_2 + 25x_3 = 0$$

b)

$\boxed{a = 9}$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|c} x_1 & x_2 & x_3 & \\ \hline 6 & -4 & 1 & 0 \\ -1 & 1 & 4 & 0 \quad / \cdot 6 \; / \cdot 4 \\ 4 & -2 & 9 & 0 \\ \hline 0 & 2 & 25 & 0 \\ -1 & 1 & 4 & 0 \\ 0 & 2 & 25 & 0 \\ \hline 0 & 2 & 25 & 0 \quad / \cdot \frac{-1}{2} \\ -1 & 1 & 4 & 0 \\ \hline 0 & 2 & 25 & 0 \\ -1 & 0 & -\frac{17}{2} & 0 \end{array}$$

$$2x_2 + 25x_3 = 0$$

$$-x_1 - \frac{17}{2}x_3 = 0$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	x_3		
6	-4	1	0	$+$
-1	1	4	0	$/\cdot 6$ $/\cdot 4$
4	-2	9	0	$+$
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
-1	1	4	0	$+$
0	2	25	0	
-1	0	$-\frac{17}{2}$	0	

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	$\boxed{x_3}$		
6	-4	1	0	+
-1	1	4	0	$/\cdot 6$ $/\cdot 4$
4	-2	9	0	+
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
-1	1	4	0	+
0	2	25	0	
-1	0	$-\frac{17}{2}$	0	

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	$\boxed{x_3}$		
6	−4	1	0	+
−1	1	4	0	$/\cdot 6 \;/\cdot 4$
4	−2	9	0	+
0	2	25	0	
−1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
−1	1	4	0	+
0	2	25	0	
−1	0	$-\frac{17}{2}$	0	

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$x_2 = -\frac{25}{2}x_3$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	$\boxed{x_3}$		
6	-4	1	0	$+$
-1	1	4	0	$/\cdot 6 \,/\cdot 4$
4	-2	9	0	$+$
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
-1	1	4	0	$+$
0	2	25	0	
-1	0	$-\frac{17}{2}$	0	

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$\boxed{x_2 = -\frac{25}{2}x_3}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|c l}
x_1 & x_2 & \boxed{x_3} & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & /\cdot 6 \;/\cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & 25 & 0 & \\
\hline
0 & 2 & 25 & 0 & /\cdot \frac{-1}{2} \\
-1 & 1 & 4 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 0 & -\frac{17}{2} & 0 &
\end{array}$$

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$\boxed{x_2 = -\frac{25}{2}x_3} \qquad x_1 = -\frac{17}{2}x_3$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

x_1	x_2	$\boxed{x_3}$		
6	-4	1	0	+
-1	1	4	0	$/\cdot 6 \;/\cdot 4$
4	-2	9	0	+
0	2	25	0	
-1	1	4	0	
0	2	25	0	
0	2	25	0	$/\cdot \frac{-1}{2}$
-1	1	4	0	+
0	2	25	0	
-1	0	$-\frac{17}{2}$	0	

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$\boxed{x_2 = -\frac{25}{2}x_3} \qquad \boxed{x_1 = -\frac{17}{2}x_3}$$

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|cl}
x_1 & x_2 & \boxed{x_3} & & \\
\hline
6 & -4 & 1 & 0 & + \\
-1 & 1 & 4 & 0 & /\cdot 6 \; /\cdot 4 \\
4 & -2 & 9 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 1 & 4 & 0 & \\
0 & 2 & 25 & 0 & \\
\hline
0 & 2 & 25 & 0 & /\cdot \frac{-1}{2} \\
-1 & 1 & 4 & 0 & + \\
\hline
0 & 2 & 25 & 0 & \\
-1 & 0 & -\frac{17}{2} & 0 &
\end{array}$$

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$\boxed{x_2 = -\frac{25}{2}x_3} \qquad \boxed{x_1 = -\frac{17}{2}x_3}$$

Opće rješenje sustava

b)

$$\boxed{a = 9}$$

$$\begin{aligned} 6x_1 - 4x_2 + x_3 &= 0 \\ -x_1 + x_2 + 4x_3 &= 0 \\ 4x_1 - 2x_2 + ax_3 &= 0 \end{aligned}$$

$$\begin{array}{ccc|c} x_1 & x_2 & \boxed{x_3} & \\ \hline 6 & -4 & 1 & 0 \\ -1 & 1 & 4 & 0 \\ 4 & -2 & 9 & 0 \\ \hline 0 & 2 & 25 & 0 \\ -1 & 1 & 4 & 0 \\ 0 & 2 & 25 & 0 \\ \hline 0 & 2 & 25 & 0 \\ -1 & 1 & 4 & 0 \\ \hline 0 & 2 & 25 & 0 \\ -1 & 0 & -\frac{17}{2} & 0 \end{array}$$

$+$ $/\cdot 6$ $/\cdot 4$ $+$

$/\cdot \frac{-1}{2}$ $+$

$$\left.\begin{aligned} 2x_2 + 25x_3 &= 0 \\ -x_1 - \frac{17}{2}x_3 &= 0 \end{aligned}\right\}$$

$$\boxed{x_2 = -\frac{25}{2}x_3} \qquad \boxed{x_1 = -\frac{17}{2}x_3}$$

Opće rješenje sustava

$$\left(-\frac{17}{2}t,\ -\frac{25}{2}t,\ t\right), \quad t \in \mathbb{R}$$