

9.3 Systems of Equations in Three Variables

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Solving a system of 3 equations & 3 unknowns

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- Clear each equation of fractions and put it in standard form.
- Choose two of the equations & eliminate one of the variables by forming a linear combination.
- Choose a different pair of equations & eliminate the same variable.
- Form a 2×2 system with the equations found in steps 2 & 3. Eliminate one of the variables from this 2×2 system using a linear combination.
- Use back-substitution to solve.

Examples

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Solve the system:

$$1. \begin{cases} -x - 5y + 2z = 2 \\ x + y + 2z = 2 \\ 3x + y - 4z = -10 \end{cases}$$

$$2. \begin{cases} x - 2y + z = 1 \\ x + y + 2z = 2 \\ 2x + 3y + z = 6 \end{cases}$$

$$3. \begin{cases} 2x - y + 2z = 6 \\ -x + y + z = 0 \\ -x - 3z = -6 \end{cases}$$

$$4. \begin{cases} 2x + y + 3z = 4 \\ -3x - y - 4z = 5 \\ x + y + 2z = 0 \end{cases}$$