

Section 5.6 (Solving Systems of Three Linear Equations in Three Unknowns by Determinants)

Many technical problems involve systems of linear equations with more than two unknowns. In this section, we solve systems with three unknowns algebraically. In the next section, we'll solve by determinants.

The objective for this section is to:

- Solve a system of linear equations in three unknowns using determinants

Evaluate the given third-order determinant.

$$1. \begin{vmatrix} -2 & 4 & -1 \\ 5 & -10 & 4 \\ 4 & -8 & 2 \end{vmatrix}$$

Solve the given system of equations using determinants:

$$\begin{aligned} & 2x + y - z = 4 \\ 1. \quad & 4x - 3y - 2z = -2 \\ & 8x - 2y - 3z = 3 \end{aligned}$$

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2.
$$\begin{aligned}3r + s - t &= 2 \\r - 2s + t &= 0 \\4r - s + t &= 3\end{aligned}$$

3. A mail-order company charges \$4 for shipping orders of less than \$50, \$6 for orders from \$50 to \$200, and \$8 for orders over \$200. One day the total shipping charges were \$2160 for 384 orders. Find the number of orders shipped at each rate if the number of orders under \$50 was 12 more than twice the number of orders over \$200.