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Solving Systems of Linear Equations in Two Variables

Learning Objectives:

1. Determine whether an ordered pair is a solution of a system of two linear equations.
2. Solve a system by graphing.
3. Solve a system by substitution.
4. Solve a system by elimination.

Examples:

1. Determine whether the given ordered pair is a solution of the system.

a) $\begin{aligned} x+y&=4 \\ x-y&=2 \end{aligned}$; (3,1) b) $\begin{aligned} y&=4 \\ x&=-3y \end{aligned}$; (−6,4) c) $\begin{aligned} 2x+y&=4 \\ -3x&=2y+8 \end{aligned}$; $\left(\frac{1}{2},3\right)$

2. Solve each system by graphing.

a) $\begin{aligned} x+y&=4 \\ x-y&=2 \end{aligned}$ b) $\begin{aligned} 2x+4y&=10 \\ 4x+3y&=10 \end{aligned}$ c) $\begin{aligned} y&=-x+3 \\ 2x+2y&=-1 \end{aligned}$

3. Use the substitution method to solve each system of equations.

a) $\begin{aligned} x+y&=4 \\ x-y&=2 \end{aligned}$ b) $\begin{aligned} \frac{1}{4}x+\frac{1}{4}y&=2 \\ x-y&=2 \end{aligned}$ c) $\begin{aligned} y&=-3x+8 \\ 12x+4y&=32 \end{aligned}$

4. Use the elimination method to solve each system of equations.

a) $\begin{aligned} x+y&=4 \\ x-y&=2 \end{aligned}$ b) $\begin{aligned} x-6y&=-9 \\ 8x-6y&=-30 \end{aligned}$ c) $\begin{aligned} x-4y&=-8 \\ -6x-3y&=-6 \end{aligned}$

d) $\begin{aligned} 3x+6y&=3 \\ 2x+9y&=-8 \end{aligned}$ e) $\begin{aligned} 6x-8y&=8 \\ 12x&=16y+24 \end{aligned}$ f) $\begin{aligned} -6x-4y&=-2 \\ -12y&=-6+18x \end{aligned}$

Answers: 1a) yes; b) no; c) no; 2a) (3,1); b) (1,2); c) ∅ ; 3a) (3,1); b) (5,3); c) {(x,y)|y=−3x+8}; 4a) (3,1); b) (−3,1); c) (0,2); d) (5,−2); e) ∅ ; f) {(x,y)|−6x−4y=−2}