

Linear Systems: SUBSTITUTION METHOD

Guided Notes

Steps for solving systems using SUBSTITUTION:

- ⊙ Step 1: Isolate one of the variables.
- ⊙ Step 2: Substitute the expression from Step 1 into the OTHER equation.
 - The resulting equation should have only one variable, not both x and y .
- ⊙ Step 3: Solve the new equation.
 - This will give you one of the coordinates.
- ⊙ Step 4: Substitute the result from Step 3 into either of the original equations.
- ⊙ Step 5: Solve for the other coordinate.
- ⊙ Step 6: Write the solution as an ordered pair. (x, y)

a) $y = 2x - 1$

Example: b) $3x + 2y = 26$

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- ⊙ Step 1: Equation **a** already has y isolated.

- ⊙ Step 2: $3x + 2y = 26$

$$3x + 2(\mathbf{2x - 1}) = 26$$

- ⊙ Step 3: $3x + 4x - 2 = 26$

$$7x - 2 = 26$$

$$\begin{array}{r} +2 \quad +2 \\ 7x - 2 = 26 \\ \hline \end{array}$$

$$7x = 28$$

$$\begin{array}{r} 7x = 28 \\ \hline 7 \quad 7 \end{array}$$

$$x = 4$$

- ⊙ Step 4: $y = 2(\mathbf{4}) - 1$

- ⊙ Step 5: $y = 7$

- ⊙ Step 6: $(\mathbf{4}, 7)$

Example: a) $-4x + y = 6$
 b) $-5x - y = 21$

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- ⊙ Step 1: Isolate Equation **a** because y has a coefficient of positive 1.

$$\begin{array}{r} -4x + y = 6 \\ +4x \quad +4x \\ \hline y = 6 + 4x \end{array}$$
- ⊙ Step 2: $-5x - y = 21$

$$-5x - (6 + 4x) = 21$$
- ⊙ Step 3: $-5x - 6 - 4x = 21$

$$\begin{array}{r} -9x - 6 = 21 \\ +6 \quad +6 \\ \hline -9x = 27 \\ -9 \quad -9 \\ \hline x = -3 \end{array}$$
- ⊙ Step 4: $y = 6 + 4(-3)$
- ⊙ Step 5: $y = -6$
- ⊙ Step 6: **$(-3, -6)$**