

What is the easiest way to solve this system?

(This is #5 from your homework.)

$$3x + 4y = 26$$

$$-2x + y = 1$$

has  $1$  or  $-1$  as coefficient

$$\begin{array}{r} -2x + y = 1 \\ +2x \quad +2x \\ \hline y = 1 + 2x \end{array}$$

$$3x + 4y = 26$$

$$3x + 4(1 + 2x) = 26$$

$$3x + 4 + 8x = 26$$

$$\begin{array}{r} 11x + 4 = 26 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\frac{11x}{11} = \frac{22}{11}$$

$$x = 2$$

Find  $y$ :

$$-2x + y = 1$$

$$-2(2) + y = 1$$

$$\begin{array}{r} -4 + y = 1 \\ +4 \quad +4 \\ \hline \end{array}$$

$$y = 5$$

$$(2, 5)$$

Check:

$$3x + 4y = 26$$

$$3(2) + 4(5) = 26$$

$$6 + 20 = 26$$

$$26 = 26 \checkmark$$

## Homework Questions?

Solve.

$$\begin{array}{l} 1. \ y = 3 - 2x \\ \quad y = 2 - 3x \end{array} \quad (-1, 5)$$

$$\begin{array}{l} 2. \ x + y = 5 \\ \quad x = y + 7 \end{array} \quad (6, -1)$$

$$\begin{array}{l} 3. \ x - y = 1 \\ \quad 2x + y = 8 \end{array} \quad (3, 2)$$

$$\begin{array}{l} 4. \ 3x - y = 9 \\ \quad y = x + 5 \end{array} \quad (7, 12)$$

$$\begin{array}{l} 5. \ 3x + 4y = 26 \\ \quad -2x + y = 1 \end{array} \quad (2, 5)$$

$$\begin{array}{l} 6. \ y = 2x + 3 \\ \quad y = 4x + 4 \end{array} \quad \left(-\frac{1}{2}, 2\right)$$

# Substitution

- Find which equation has a coefficient of 1 or  $-1$  for either  $x$  or  $y$ .
- Isolate that variable using properties of equality.
- Substitute the expression that is equal to either the  $x$  or  $y$  you isolated into the other equation and solve.

7.  $2x + 7y = 8$   
 $x + 5y = 7$   
 $\quad \quad \quad \underline{-5y \quad -5y}$   $x = 7 - 5y$

9.  $x + 3y = 17$   
 $2x + 3y = 22$

11.  $8x - 5y = 9$   
 $y = 2x - 4$   
 $8x - 5(2x - 4) = 9$   
 $8x - 10x + 20 = 9$

13.  $3x + y = 5$   
 $2x + 3y = 8$   
 $\quad \quad \quad \underline{-3x \quad -3x}$   $y = 5 - 3x$

8.  $y = 4x + 4$   
 $y = 2x + 8$   
 $4x + 4 = 2x + 8$

10.  $4x - 7y = 9$   
 $y = x - 3$

12.  $2x + 4y = -2$   
 $3x + y = 7$   
 $\quad \quad \quad \underline{-3x \quad -3x}$   $y = 7 - 3x$

14.  $2x + 6y = 24$   
 $x - 4y = -2$   
 $\quad \quad \quad \underline{+4y \quad +4y}$   
 $x = 4y - 2$