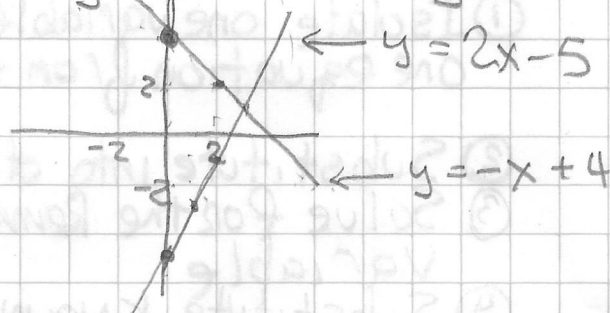


## Solve by Graphing (3.1.2)

$$\begin{aligned}x + y &= 4 \Rightarrow y = -x + 4 \\2x - y &= 5 \Rightarrow -y = -2x + 5 \Rightarrow y = 2x - 5\end{aligned}$$



$(3, 1)?$

CONSISTENT  
INDEPENDENT

CHECK:

$$\begin{aligned}x + y &= 4 \\3 + 1 &= 4 \\4 &= 4 \checkmark\end{aligned}$$

$$\begin{aligned}2x - y &= 5 \\2(3) - 1 &= 5 \\6 - 1 &= 5 \\5 &= 5 \checkmark\end{aligned}$$

## CLASSIFY Systems:

Consistent - CAN find solution  
INCONSISTENT - NO solution

Independent - you can find  $x$  or  $y$  by itself  
dependent - you need  $x$  to find  $y$ , or  $y$  to find  $x$

### Parallel lines

inconsistent, INDEPENDENT  $\{ \}$  no solution

### Same line

dependent, consistent  $\{(x, y) \mid y = -x + 2\}$

$$2x + 3y = 7$$

$$4x + 6y = 14$$

② Solve by using Substitution

$$\begin{aligned} 2x + y &= 1 \\ 4x + 3y &= 1 \end{aligned}$$

$$2x + y = 1 \Rightarrow y = -2x + 1$$

$$\begin{aligned} 4x + 3(-2x + 1) &= 1 \\ 4x - 6x + 3 &= 1 \\ -2x &= -2 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} y &= -2(1) + 1 \\ y &= -2 + 1 = -1 \\ y &= -1 \end{aligned} \quad (1, -1)$$

$$\begin{aligned} 2x + y &= 1 \\ 2(1) + (-1) &= 1 \\ 2 - 1 &= 1 \\ 1 &= 1 \checkmark \end{aligned}$$

$$\begin{aligned} 4x + 3y &= 1 \\ 4(1) + 3(-1) &= 1 \\ 4 - 3 &= 1 \\ 1 &= 1 \checkmark \end{aligned}$$

① Isolate one variable in one equation from the other

② Substitute into other equation

③ Solve for the Remaining Variable

④ Substitute known value into one of the equations

⑤ Check in both equations

Parallel (3.2.4)

$$\begin{cases} x - 3y = 2 \\ 2x = 6y + 8 \end{cases} \Rightarrow x = 3y + 2$$

$$\begin{aligned} 2x &= 6y + 8 \\ 2(3y + 2) &= 6y + 8 \\ 6y + 4 &= 6y + 8 \\ 4 &= 8 \leftarrow \text{inconsistent} \end{aligned}$$

Dependent

$$\frac{1}{2}x + \frac{1}{4}y = 4 \quad \left( \frac{1}{2}x + \frac{1}{4}y = 4 \right) \Rightarrow 2x + y = 4 \Rightarrow y = -2x + 4$$
$$2(x + 4) = 4 + y \Rightarrow 2x + 2y = 4 + y \Rightarrow 2x + y = 4$$

$$\begin{aligned} 2x + (-2x + 4) &= 4 \\ 2x - 2x + 4 &= 4 \\ 4 &= 4 \end{aligned}$$

Consistent

$$\begin{cases} 5x - 4y = 2 \\ -3x + 7y = -15 \end{cases}$$

$$\begin{aligned} 3(5x - 4y) &= 3(2) \\ 5(-3x + 7y) &= 5(-15) \end{aligned}$$

③

$$\begin{aligned} 15x - 12y &= 6 \\ + \quad -15x + 35y &= -75 \\ \hline \end{aligned}$$

$$\begin{aligned} 23y &= -69 \\ y &= -3 \end{aligned}$$

$$\begin{aligned} 5x - 4y &= 2 \\ 5x - 4(-3) &= 2 \\ 5x + 12 &= 2 \\ 5x &= -10 \\ x &= -2 \end{aligned}$$

$(-2, -3)$

$$\begin{aligned} 5x - 4y &= 2 \\ 5(-2) - 4(-3) &= 2 \\ -10 + 12 &= 2 \end{aligned}$$

$$\begin{aligned} -3x + 7y &= -15 \\ -3(-2) + 7(-3) &= -15 \\ 6 - 21 &= -15 \end{aligned}$$

Dependent

$$\begin{aligned} \begin{cases} -y - 2x = -28 \\ x + \frac{1}{2}y = 14 \end{cases} &\rightarrow \begin{aligned} -2x - y &= -28 \\ 2(x + \frac{1}{2}y) &= 2(14) \end{aligned} \\ &\rightarrow \begin{aligned} -2x - y &= -28 \\ 2x + y &= 28 \\ \hline 0 &= 0 \end{aligned} \end{aligned}$$

Inconsistent  $(3, 3, 5)$

$$\begin{aligned} 0.3x &= 0.4y - 1 \\ 6x &= 8y \end{aligned} \Rightarrow \begin{aligned} 0.3x - 0.4y &= -1 \\ 6x - 8y &= 0 \end{aligned}$$

$$\begin{aligned} -2(3x - 4y) &= (-10) - 2 \\ 6x - 8y &= 0 \end{aligned}$$

$$\begin{aligned} -6x + 8y &= 20 \\ + \quad 6x - 8y &= 0 \\ \hline 0 &= 20 \end{aligned}$$

1d 80.23 4d 58.82 Pwongro