

$$1a) \begin{cases} y = 3x + 2 \\ x + y = 14 \end{cases}$$

We know that y is the same as $(3x + 2)$

$$x + [3x + 2] = 14$$

We will substitute $y = 3x + 2$

$$x + 3x + 2 = 14$$

$$4x = 14 - 2$$

$$4x = 12$$

$$x = \frac{12}{4}$$

$$\underline{x = 3}$$

← We know x , now we need y .
Put $x = 3$ into the first eqⁿ.

$$y = 3x + 2$$

$$y = 3(3) + 2$$

$$y = 9 + 2$$

$$y = 11$$

$$\text{sol}^n = (3, 11)$$

$$1b) y = -3x$$

$$y - x = 24$$

$$[-3x] - x = 24$$

$$-3x - x = 24$$

$$-4x = 24$$

$$x = \frac{24}{-4}$$

$$x = -6$$

Now we know x . We use that to find y .

$$y = -3x$$

$$y = -3(-6)$$

$$y = 18$$

$$\text{sol}^n = (-6, 18)$$

$$2a) 2x - 3y = 10$$

$$x + y = 0$$

$$x = -y$$

Now we see, that x is the same as $-y$.

So we substitute $x + y$

$$2(-y) - 3y = 10$$

y & $-3x$ are the same thing!!

We'll write $-3x$ instead of y

We need to find what either x or y is equal to.

$$\begin{aligned} -2y - 3y &= 10 \\ -5y &= 10 \\ y &= \frac{10}{-5} \end{aligned}$$

$$y = -2$$

we know $y \rightarrow$ use it to set x . :)

$$x = -y$$

$$x = -(-2)$$

$$x = 2$$

$$\text{sol}^n \rightarrow (2, -2)$$

Jump to #17 because same student is doing a mad flex. (not saying it's Spencer but it is).

School A \rightarrow 8 vans + 8 buses = 400 students.

School B \rightarrow 4 vans + 1 bus = 68 students

$$\begin{aligned} \rightarrow 8v + 8b &= 400 \\ \rightarrow 4v + b &= 68 \end{aligned} \left. \vphantom{\begin{aligned} \rightarrow 8v + 8b &= 400 \\ \rightarrow 4v + b &= 68 \end{aligned}} \right\} \begin{array}{l} \text{solve for either} \\ v \text{ or } b. \end{array}$$

$$b = -4v + 68$$

\hookrightarrow use this in eqⁿ ①

$$8v + 8[-4v + 68] = 400$$

$$8v - 32v + 544 = 400$$

$$-24v = 400 - 544$$

$$-24v = -144$$

$$V = \frac{-144}{-24}$$

$$V = 6$$

we now know $V=6$, we use this to set b .

$$8V + 8b = 400$$

$$8(6) + 8b = 400$$

$$48 + 8b = 400$$

$$8b = 400 - 48$$

$$8b = 352$$

$$b = \frac{352}{8}$$

$$b = 44$$

Vans hold 6 people.

Buses hold 44 people.

$$2b) \quad m = 8j$$

$$-m + 2 = -7j$$

we know what m is.
substitute.

$$-(8j) + 2 = -7j$$

$$-8j + 2 = -7j$$

$$-8j + 7j + 2 = 0$$

$$-8j + 7j = -2$$

$$-j = -2$$

$$j = 2$$

We know j . Use it to find m .

$$m = 8(2)$$

$$m = 16$$

$$2k = 6n + 9$$

$$n - 2k = -4$$

Solve for k or n .

→ $n = 2k - 4$ ← put this 'n' into eqⁿ (1)

$$2k = 6(2k - 4) + 9$$

$$2k = 12k - 24 + 9$$

$$2k - 12k = -24 + 9$$

$$-10k = -15$$

$$k = \frac{-15}{-10}$$

$$k = \frac{3}{2}$$

← We know k . Let's get n .

$$n = 2k - 4$$

$$n = 2\left(\frac{3}{2}\right) - 4$$

$$n = 3 - 4$$

$$n = -1$$

Check

$$2k = 6n + 9$$

$$2\left(\frac{3}{2}\right) = 6(-1) + 9$$

$$3 = -6 + 9$$

3 = 3 ✓
we be smrt.

$$3c) \begin{cases} \frac{x}{2} = 5 - y \\ x + y = 7 \end{cases}$$

Solve for x or y.

$$x = 2(5 - y)$$

$$x = -y + 7$$

easier

$$\frac{(-y + 7)}{2} = 5 - y$$

$$-y + 7 = 2(5 - y)$$

$$-y + 7 = 10 - 2y$$

$$-y + 2y + 7 = 10$$

$$-y + 2y = 10 - 7$$

$$y = 3$$

use this to get x.

$$x + y = 7$$

$$x + 3 = 7$$

$$x = 7 - 3$$

$$x = 4$$

$$\text{sol}^n = (4, 3)$$

$$4a) y = \frac{x}{3} - 5$$

substitute y into ②

$$x - \frac{y}{5} = 13$$

$$x - \frac{\left(\frac{x}{3} - 5\right)}{5} = 13$$

$$-\frac{\left(\frac{x}{3} - 5\right)}{5} = -x + 13$$

$$\frac{-\frac{x}{3} + 5}{5} = -x + 13$$

$$-\frac{x}{3} + 5 = 5(-x + 13)$$

$$-\frac{x}{3} + 5 = -5x + 65$$

$$-\frac{x}{3} + 5x + 5 = 65$$

$$-\frac{x}{3} + 5x = 65 - 5$$

$$\frac{-x + 15x}{3} = 60$$

$$\frac{14x}{3} = 60$$

$$14x = 60(3)$$

$$14x = 180$$

$$x = \frac{180}{14}$$

$$x = \frac{90}{7}$$

← ugly but right.

$$y = \frac{x}{3} - 5$$

$$y = \frac{90}{7} - 5$$

$$y = \frac{90}{7} \left(\frac{1}{3} \right) - 5$$

$$y = \frac{30}{7} - 5$$

$$y = \frac{30 - 35}{7}$$

$$y = -\frac{5}{7}$$

$$\text{Sol}^n = \left(\frac{90}{7}, -\frac{5}{7} \right)$$

$$4b) \quad \frac{y-x}{2} = 5 \quad \rightarrow \quad \begin{array}{l} y-x = 5(2) \\ y-x = 10 \end{array}$$

$$\frac{x+3x}{4} = 4 \quad \rightarrow \quad x = -\frac{3x}{4} + 4$$

← put x in.
"substitution"

$$y - \left(-\frac{3x}{4} + 4 \right) = 10$$

$$y + \frac{3x}{4} - 4 = 10$$

$$y + \frac{3x}{4} = 10 + 4$$

$$\frac{4y+3x}{4} = 14$$

$$\frac{7y}{4} = 14$$

$$7y = 4(14)$$

$$y = \frac{4(14)}{7}$$

$$y = 8$$

$$\frac{y-x}{2} = 5$$

$$\frac{8-x}{2} = 5$$

$$8-x = 10$$

$$-x = 10 - 8$$

$$-x = 2$$

$$x = -2$$

use this to find x .

Solⁿ $(-2, 8)$

$$4c) \textcircled{1} 3y = \frac{1-2x}{3}$$

We can make these easier!

$$\textcircled{2} x + \frac{3y}{2} = 12$$

$$\textcircled{1} 9y = 1-2x$$

$$\textcircled{2} 2x + 3y = 24$$

→ solve for x

$$\rightarrow 2x = -3y + 24$$

$$x = -\frac{3y}{2} + 12$$

① Sub into

$$ay = 1 - 2\left(\frac{-3y}{2} + 12\right)$$

$$ay = 1 + 3y - 24$$

$$ay - 3y = 1 - 24$$

$$6y = -23$$

$$y = -\frac{23}{6}$$

sub in ②

$$2x + 3y = 24$$

$$2x + 3\left(-\frac{23}{6}\right) = 24$$

$$2x - \frac{23}{2} = 24$$

$$2x = 24 + \frac{23}{2}$$

$$2x = \frac{48 + 23}{2}$$

$$2x = \frac{71}{2}$$

$$x = \frac{71}{4}$$

Solⁿ $\left(\frac{71}{4}, -\frac{23}{6}\right)$