§4.1 #28

$12\left(\frac{2}{3}x + \frac{1}{4}y = -\frac{3}{2}\right)$ LCD = 12

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

$\frac{4}{12}\left(\frac{2}{3}x\right) + \frac{3}{12}\left(\frac{1}{4}y\right) = \frac{6}{12}\left(-\frac{3}{2}\right)$

$8x + 3y = -18$

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

$2x - y = -8$

$8x+3y = -18$ E1

$-4(2x - y = -8)$ E2

want E1 + -4E2 to eliminate x

-4E2 $-8x + 4y = 32$

E1 $8x + 3y = -18$

-4E2+E1 $7y = 14$

$y = \frac{14}{7} = 2 = y$

New System:

$8x+3y = -18$

$y = 2$

↳ send this back

$8x+3y = -18$

$8x+3(2) = -18$

$8x+6 = -18$

$8x = -24$

$x = \frac{-24}{8} = -3 = x$

$(x,y) \in \{(-3,2)\}$

A consistent, dependent system

$-2(3x+2y=5) \longrightarrow -6x-4y=-10$

$6x+4y=10$

$6x+4y=10$

$0=0$

That says $3x+2y=5$ contains all the solutions. One way to represent the solution set is:

$\{(x,y) \mid 3x+2y=5\}$

Standard way: let one variable be free & the other depend on it.

$3x+2y=5$

$2y=-3x+5$

$y=-\frac{3}{2}x+\frac{5}{2}$

x is free!

Sol'n Set: $\{(x,-\frac{3}{2}x+\frac{5}{2}) \mid x \in \mathbb{R}\}$

§4.2 Systems of 3 Equations

Eliminate x in 2 equations using the "other equation." write the new system.

Solve the resulting system of two equations like we did in 4.1. write the new system.

Use solution from the previous step to find x in the "other equation"

ORIGINAL SYSTEM

Sara,

$x - y + z = -4$ E1

$3x + 2y - z = 5$ E2

$-2x + 3y - z = 15$ E3

$-3E1 + E2$

$-3(x - y + z = -4)$ $-3E1$ $-3x + 3y - 3z = 12$

E2 $3x + 2y - z = 5$

$-3E1 + E2$ $5y - 4z = 17$

Stephanie

$2E1 + E3$

$2(x - y + z = -4)$ $2E1$ $2x - 2y + 2z = -8$

E3 $-2x + 3y - z = 15$

$2E1 + E3$ $y + z = 7$

New System

$x - y + z = -4$

$5y - 4z = 17$

$y + z = 7$

} solve for x & y

Sep 28-11:34 AM

$-5(y + z = 7)$
$5y - 4z = 17$

$-5y - 5z = -35$
$5y - 4z = 17$
$-9z = -18$

$z = \frac{-18}{-9} = 2 = z$

New System:

$x - y + z = -4$
$y + z = 7$
$z = 2$

Back-substitute : $z = 2$

$y + z = 7$
$y + 2 = 7$
$y = 5$

$z = 2, y = 5$

half the dum class.

$x - y + z = -4$
$x - 5 + 2 = -4$
$x - 3 = -4$
$x = -1$

$(x, y, z) \in \{(-1, 2, 5)\}$

I need to see your 3 systems

$x = 5$
$2x + 3y = 7$
$5x - 7y + 11z = 54$

A line in 2-space
A plane in 3-space

$$x - y + z = -4$$
$$3x + 2y - z = 5$$
$$-2x + 3y - z = 15$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & -4 \\ 3 & 2 & -1 & 5 \\ -2 & 3 & -1 & 15 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -1 & 1 & -4 \\ 0 & 5 & -4 & 17 \\ 0 & 1 & 1 & 7 \end{array}\right]$$

$$\sim \left[\begin{array}{ccc|c} 1 & -1 & 1 & -4 \\ 0 & 1 & 1 & 7 \\ 0 & 5 & -4 & 17 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -1 & 1 & -4 \\ 0 & 1 & 1 & 7 \\ 0 & 0 & -9 & -18 \end{array}\right]$$

§4.2 #s 5, 10, 13, 17, 25, 32 FRIDAY

§4.3 #s 1, 6, 8, 23, 37, 38

Setup only

§4.5 #s 1, 4, 7, 12, 15, 20