

Office hours - Mon, Sept. 20

"3x3-System" - die Friday

→ 2x2 system

(also finish
"GCF-Grouping")

in class Friday -

finish "3x3" #2

Solving a 3×3 linear system :

① "Extract" a 2×2 linear system from the given 3 equations.

- use 2 different pairs of the 3 eqns, to eliminate one of the variables (twice!)

② Solve that 2×2 linear system (so that you have solved for 2 of the 3 variables)

③ Solve for the 3rd remaining variable
(i.e., the variable you eliminated in Step 1!)
- by plugging the results of step 2 into any of 3

Additional
Elimination.

WW, "3x3", #3

$$\begin{array}{r} -2x - 4y + 3z = 1 \quad (1) \\ -2x + y + 5z = 22 \quad (2) \\ 3x - 5y - 5z = -36 \quad (3) \end{array}$$

$$\cancel{0x} \quad -5y - 2z = -21 \quad (1) - (2)$$

Eliminate x again, using a diff pair of eqns!

Let's use Eqns. (2) and (3):

~~2x~~
~~3x~~

$$-6x + 3y + 15z = 66$$

$$6x - 10y - 10z = -72$$

$$(2) \times 3$$

$$(3) \times 2$$

in order to
scale the
 x -coefficients
up to their
LCM of 6!

$$-7y + 5z = -6$$

"Extracted" 2x2 system:

$$\begin{cases} -5y - 2z = -21 \\ -7y + 5z = -6 \end{cases} \begin{array}{l} \times 5 \\ \times 2 \end{array} \Rightarrow \begin{array}{r} -25y - 10z = -105 \\ -14y + 10z = -12 \\ \hline -39y = -117 \\ \Rightarrow y = \frac{-117}{-39} = 3 \end{array}$$

→ Plug $y=3$ into either of the 2D eqns:

$$-7(3) + 5z = -6$$

$$-21 + 5z = -6$$

$$5z = 15 \Rightarrow z = 3$$

Last step: Solve for x (by plugging in $y=3$, $z=3$):

$$-2x - 4(3) + 3(3) = 1 \Rightarrow -2x = 4 \Rightarrow x = -2$$