MAT1275CO/OL27 – Class #7
(Tues Sept 14)

Agenda:

- Finish 3×3 linear systems. (§ 4.4 / "3×3-Systems") — WW
- start the next topic:
  - factoring:
    - GCF / Grouping.
- Discuss Quiz #1

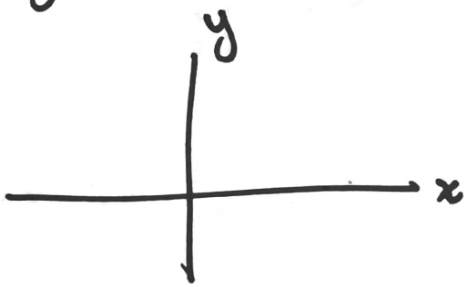
(due next Tues)

(you can download my Class Notes on Openlab - Files).

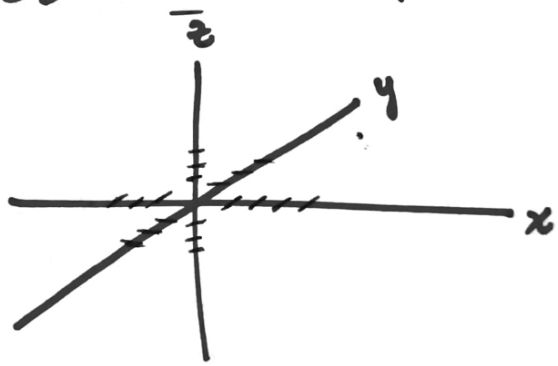
Last time: We solved a (simple) 3×3 linear system (WW, "3×3" #1)

- Graphical interpretation of a 3×3 linear system?

xy-coordinate "plane"



3D-coordinate "space"



General form of a linear equation in 3 var's?

$$Ax + By + Cz = D$$

Example: Solving a (slightly) more complicated 3×3 linear system:

(WW, "3×3", Problem 2):

$$x - y - 5z = 19 \quad (1)$$
$$4x + 4y + z = 0 \quad (2)$$
$$x + y - 2z = 9 \quad (3)$$

1st step: Use 2 of the given equations, and eliminate one of the variables by the "Addition" Method.

$(1) + (3)$:

$$2x - 7z = 28$$

Using equations (1) and (2):

$(1) \times 4$:

$$4x - 4y - 20z = 76$$
$$4x + 4y + z = 0 \quad (2)$$

$$8x - 19z = 76$$

2nd step: Use a different pair of the given equations, eliminate the same variable (by the Addition Method)

Next step: Solve the 2×2 linear system (which we have "extracted" from the orig. given 3×3 system) for x and z!

(1) $2x - 7z = 28$

(2) $8x - 19z = 76$

Suggested exercise! Solve this 2×2 system (for x and z) before class on Friday!

$\times 4$

$4*(1)$: $8x - 28z = 112$

$-$ (2): $8x - 19z = 76$

$0x - 9z = 36$

$\Rightarrow \boxed{z = \frac{36}{-9} = -4}$

Now solve for x!

Now let's solve for x (within the 2×2 system)
(plug $z=-4$ into either equation)

(1) : $2x-7(-4)=28$

$2x+28=28$

$2x=0 \Rightarrow \boxed{x=0}$ ✓

Last step : Solve for y ... by plugging in

$\boxed{x=0,\ z=-4}$ into any of the original 3 eqns!

(1) $x-y-5z=19 \Rightarrow 0-y-5(-4)=19$

$\Rightarrow -y+20=19$

$-y=-1$

$\boxed{y=1}$

or using (3) : $x+y-2z=9$

$\Rightarrow 0+y-2(-4)=9$

$y+8=9 \Rightarrow \boxed{y=1}$