Math 2270-3
Monday Aug 24
10:45-11:35 LCB 215

Welcome back!!

HW for this Friday, Aug 28

1.1 3 (6) (11) (13) (19) 20 (21) (24) 27, (28) (29) (44)

1.2 1, (3) (9) (10) (16) (17)

Read along, example 1, page 1, of text!

"The yield of one bundle of inferior rice, two bundles of medium grade rice and three bundles of superior rice is 39 don of grain. The yield of one bundle inf. rice, 3 bund. med-grade rice, 2 bund. sup. grade rice is 34 don of grain. The yield of 3 bund. inf. rice, 2 bund. med. rice, 1 bund. sup. rice is only 26 don."

Question: What is the yield of one bundle of each grade of rice?

Ans:

x = yield/bundle for inf. rice
y = yield/bundle for med. rice
z = yield/bundle for sup. rice

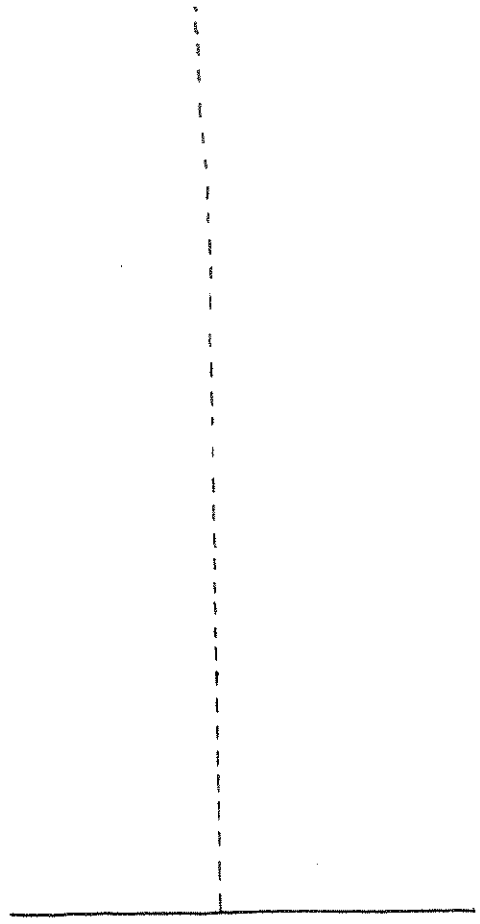
$$\begin{aligned} 1\cdot x + 2y + 3z &= 39 \\ x + 3y + 2z &= 34 \\ 3x + 2y + z &= 26 \end{aligned}$$

use elementary equation operations to solve this:

non of these ops change sol'n set! (why?)

- mult. eqtn by non-zero constant
- interchange eqtns
- add multiple of different eqtn to given eqtn

el. row ops



linear algebra ↔ linear geometry

solution set of each equation on page 1 is a plane in $\mathbb{R}^3$.

seeking all (x,y,z) which satisfy the system of eqtns is seeking the intersection point (s) of the 3 planes!

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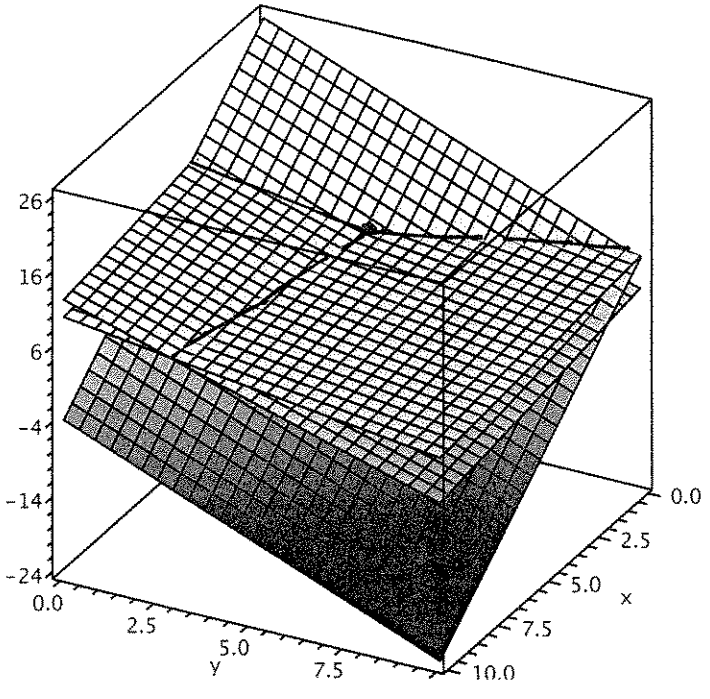
> plot1 := plot3d({ (39 - x - 2·y)/3, (34 - x - 3·y)/2, (26 - 3·x - 2 y) },
      x = 0..10, y = 0..10, axes = boxed) :
  plot2 := pointplot3d({[2.75, 4.25, 9.25]}, symbol = solidcircle, symbolsize = 20, color
      = black) :
  display3d({plot1, plot2});
```

this plot made with MAPLE.



What other geometric configurations are possible for 3 eqtns in 3 unknowns?

(You might start with 2 eqtns in 3 unknowns.)

Sketch pictures, see if you can find example systems of equations yielding each picture geometry!