Math 511

Due Monday (Scan as PDF for Blackboard)

(Due @ 1pm)

- [ ] 1.1 (16, 5c, 6e, 8*, 9*, 10, 11*)

What does Mark mean on "Do my textbook ... (5) 1st 'read' textbook"?

expectation

1. read the book
2. do as many examples as 'reasonable'
   - start it, close book, finish
   - → self grade
   - repeat
3. **Ask q's**
4. do as many exercises as possible

1.1 Systems of Linear Equations

$$\begin{cases} x + 3y - z = 1 \\ x + y - 2z = 0 \end{cases}$$

Solve?

Ex

$$\begin{cases} 2x - y = 3 \\ x + y = 1 \end{cases}$$

$x = 1 - y$

$2(1-y) - y = 3$

$2 - 2y - y = 3$

$2 - 3y = 3$

$-3y = 1$

$y = -\frac{1}{3}$

back sub

$x = 1 - y$

$x = 1 - \left(-\frac{1}{3}\right) = \frac{4}{3}$

(ex) $2x - y = 3$

$x + y = 1$

$3x + 0 = 4$

$x = 4/3$

$x + y = 1$

$\frac{4}{3} + y = 1$

$y = -\frac{1}{3}$

$x - y + z = 2$

$2x - y + 3z = 9$

$\frac{1}{2}x + y = 5/2$

ans $(1, 2, 3)$

Do this!

Sub $x = 2 + y - z$

$2(2 + y - z) - y + 3z = 9$

$\frac{1}{2}(2 + y - z) + y = 5/2$

Systems of eqn's

Coeff: a_{ij} Vars: $x_1, x_2, x_3, \ldots$ n-vars

Consts: b_j

eqn 1 (row 1) $a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + \cdots + a_{1n}x_n = b_1$

eqn 2 (row 2) $a_{21}x_1 + a_{22}x_2 + a_{23}x_3 + \cdots + a_{2n}x_n = b_2$

$\vdots$

eqn M (row m) $a_{m1}x_1 + a_{m2}x_2 + \cdots + a_{mn}x_n = b_m$

Matrix

Coeff:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ \vdots & & & & \vdots \\ a_{m1} & a_{m2} & a_{m3} & \cdots & a_{mn} \end{bmatrix}$$

M x n matrix

$$A = [a_{ij}]$$

Solving: $M \equiv$ eqn's $\quad n \equiv$ var's

a) no solution b) solution → exactly 1
→ ∞ solu's

A) $M > n$ overdetermined.
typically no solution

B) $M < n$ underdetermined
if it has soln → ∞ soln's

it can still have 0.

(c) $M = N$ — determined

"typically" exactly one sol'n.