October 20

Announcements

- Midterm 1 scores are out
- Median is a 51, Mean is a 48
- Grade approximations will be released this weekend
- Webassign 3.2, 3.3 due next Thursday
- Everyone gets credit for worksheet 3
- Worksheet 4 posted tonight

3.2 Matrix Algebra

Addition and scale multiplication

We can add and scale multiply matrices by pretending they are vectors. This has all the nice properties vectors have. See 3.11 in the book.

Matrix mutliplication

Let A be an $n \times k$ matrix and $B = [b_1\ b_2\ \dots\ b_m]$ be a $k \times m$. We define the product $AB = [Ab_1\ Ab_2\ \dots\ Ab_m]$ which is an $n \times m$ matrix.

Do an example in class.

The identity matrix is a thing. Here it is.

Properties of Matrix Algbera

- $A(BC) = (AB)C$
- $A(B + C) = AB + AC$
- $(A + B)C = AC + BC$
- $s(AB) = (sA)B = A(sB)$
- $AI = A$
- $IA = A$

The key thing to know is that $AB \neq BA$ and that $AB = 0$ does not imply $A = 0$ or $B = 0$.

Matrix multiplication are important because they correspond to composition of linear functions. Do example in class. Write this as a theorem?

Traspose are a thing

You flip the rows and columns. The key things to know are

- $(A + B)^t$
- $(sA)^t = sA^t$
- $(AC)^t = C^t A^t$

Diaginal matrices are a thing

Elementary matrices are a thing

Elementary matices are the matrices that correpond to elementary row operations. Figure them out with class. It'll be fun.

Block multiplication

They are a thing. You feel great them you get it to work.