Math 2250-3
Friday 9/24

- finish Wed notes
  - page 5, on what rref(A) tells us about possible solution sets to $A\vec{x}=\vec{b}$
  - page 6 & 7 about the superposition principle for linear equations

- Matrix algebra

<u>addition</u>: If A and B are both $m \times n$, then

$$\text{entry}_{ij}(A+B) := a_{ij} + b_{ij}$$

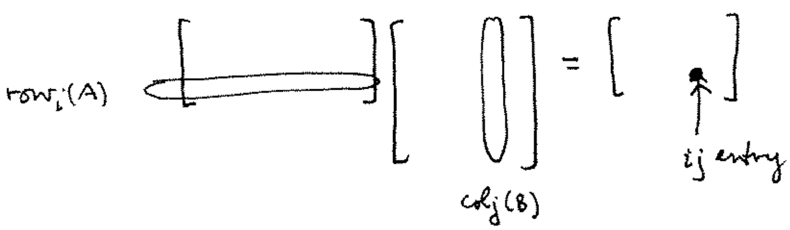
<u>Scalar multiplication</u>:

$$\text{entry}_{ij}(cA) := c a_{ij}$$

} just like vector addition and scalar multiplication

<u>matrix multiplication</u>: [generalizes matrix times vector]

$$\text{entry}_{ij}(AB) = \text{row}_i(A) \cdot \text{col}_j(B)$$



so only works for

$$[A]_{m\times n}[B]_{n\times p} = [AB]_{m\times p}$$

<u>examples</u>:

Rules for this algebra

+ is commutative $A+B=B+A$

+ is associative $(A+B)+C=A+(B+C)$

scalar mult distributes over + $c(A+B)=cA+cB$

mult is associative $A(BC)=(AB)C$

mult distributes over + $A(B+C)=AB+AC$

$$(A+B)C=AC+BC$$

mult <u>not</u> commutative in general : DON'T EXPECT $AB=BA$!

<u>check properties</u> :