**Source:** [KBe2020math530floIndex]

## Participation

- Unmute yourself

## Homework Review

- From homework 20math530retReadingTheTextbook

### Is Dot Product Nice?

- Nice = group properties
    - They aren't because its not closed
    - However, we still like dot product because it can easily tell us if the thing is perpendicular

### Inverse of a matrix

- Use 2 systems of equations (2 variables, 2 equations, twice) [KBe20math530srcMatrixInverse].png
- $y = \frac{c}{bc-ad} = \frac{-c}{ad-bc}$
- Determinant determines whether its possible to have an inverse (because if it's zero, then it's not possible!)
    - A matrix with no inverse is **SINGULAR**
    - Determinant of $A$ is zero
    - A has no inverse

## Proof Attempt Discussion Page?

## Small Groups

1. Calculate cross products
2. Graph cross products
3. Cross Product geometry?
    - It's the perpendicular!
    - #bonushw its perpendicular
4. Determinant geometric interpretation?
    - It's the perpendicular! IF you crossproduct-ify
    - $\begin{bmatrix} x \\ y \end{bmatrix} \Rightarrow \left| \begin{bmatrix} i & j \\ x & y \end{bmatrix} \right| = iy - jx = \begin{bmatrix} y \\ -x \end{bmatrix}$ ## Taking the Determinant (why +-+-?)
    - We take the sub-matrices on a torus
        - But if you wrap everything around properly then you have a plus in front of every coefficient
        - But if you don't wrap it, then the determinant ends up being the negative, so that's why there's the whole plus minus thing.

---