

Source: [\[KBe2020math530fIndex\]](#)

## 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!
  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
  - 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 thats why there's the whole
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