Source:

Looking forward

- Will use canvas's discussion board in the future.
- Assume matrices have real numbers

Solving with Matrices

- Elementary matrices (like $\begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$)
- Steps walk through

    - Start with $\begin{bmatrix} a & b \\ d & e \end{bmatrix}$ (the coefficient matrix).

    - You want to get somewhere such that $\begin{bmatrix} 1x \\ 0y \end{bmatrix} = \begin{bmatrix} c \\ f \end{bmatrix}$

    - And ultimately $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} ans_x \\ ans_y \end{bmatrix}$
    - srcD3SolveWithMatricies.png

Matrix Inverse Formula

- I should technically know this already.

Derivation

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} w & x \\ y & z \end{bmatrix} \begin{bmatrix} aw+by & ax+bz \\ cw+dy & cx+dz \end{bmatrix} \therefore$$

$$
\begin{aligned}
aw + by &= 1 \\
cw + dy &= 0 \\
ax + bz &= 0 \\
cx + dz &= 1
\end{aligned}
$$

- There's two 2 variable equations. srcIdentityMatrixFormula.png

Matrix Operations

- If we have a set of objects that are almost groups in under both addition and multiplication, then it's called a field

    - 2x2 Matrices aren't quite close enough on the multiplication (too many no inverses) but we can work with other sizes. ### Vector Products

- Matrices of dimension nx1
- What multiplications on vectors are "nice"?

    - Transpose the first (left) one and multiply normally, then squish 2x2 into 2x1
    - Cross product
    - Element wise (is closed)
    - Take every element and multiply them all together, and then duplicate?

        - No, no identity
    - Any one to one mapping?

- No, identity doesn't work if it's on the left.