1 | **Looking forward**

- Will use canvas's discussion board in the future.

- Assume matrices have real numbers

2 | **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

3 | **Matrix Inverse Formula**

- I should technically know this already.

3.1 | **Derivation**

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

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

4 | **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.