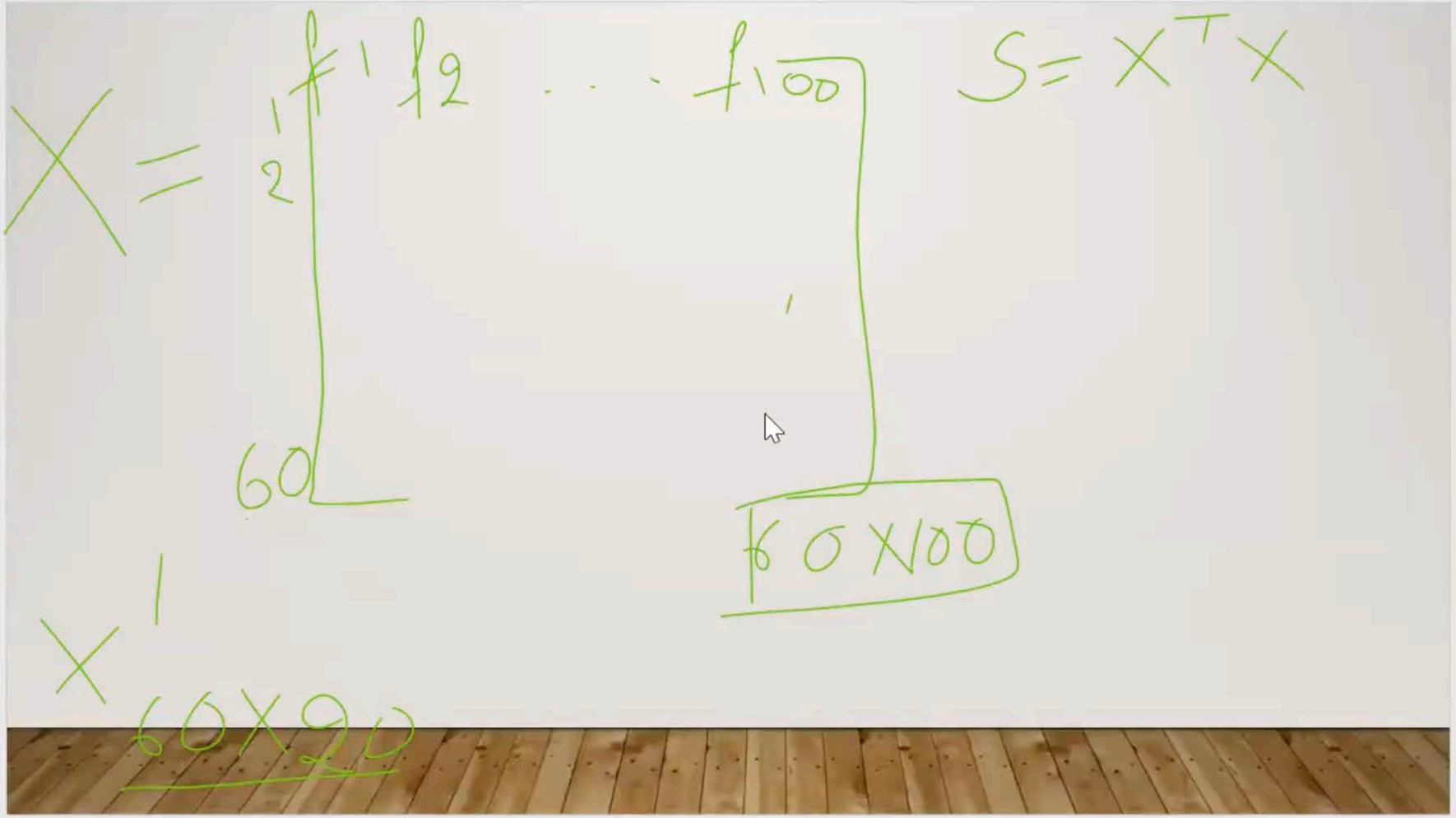


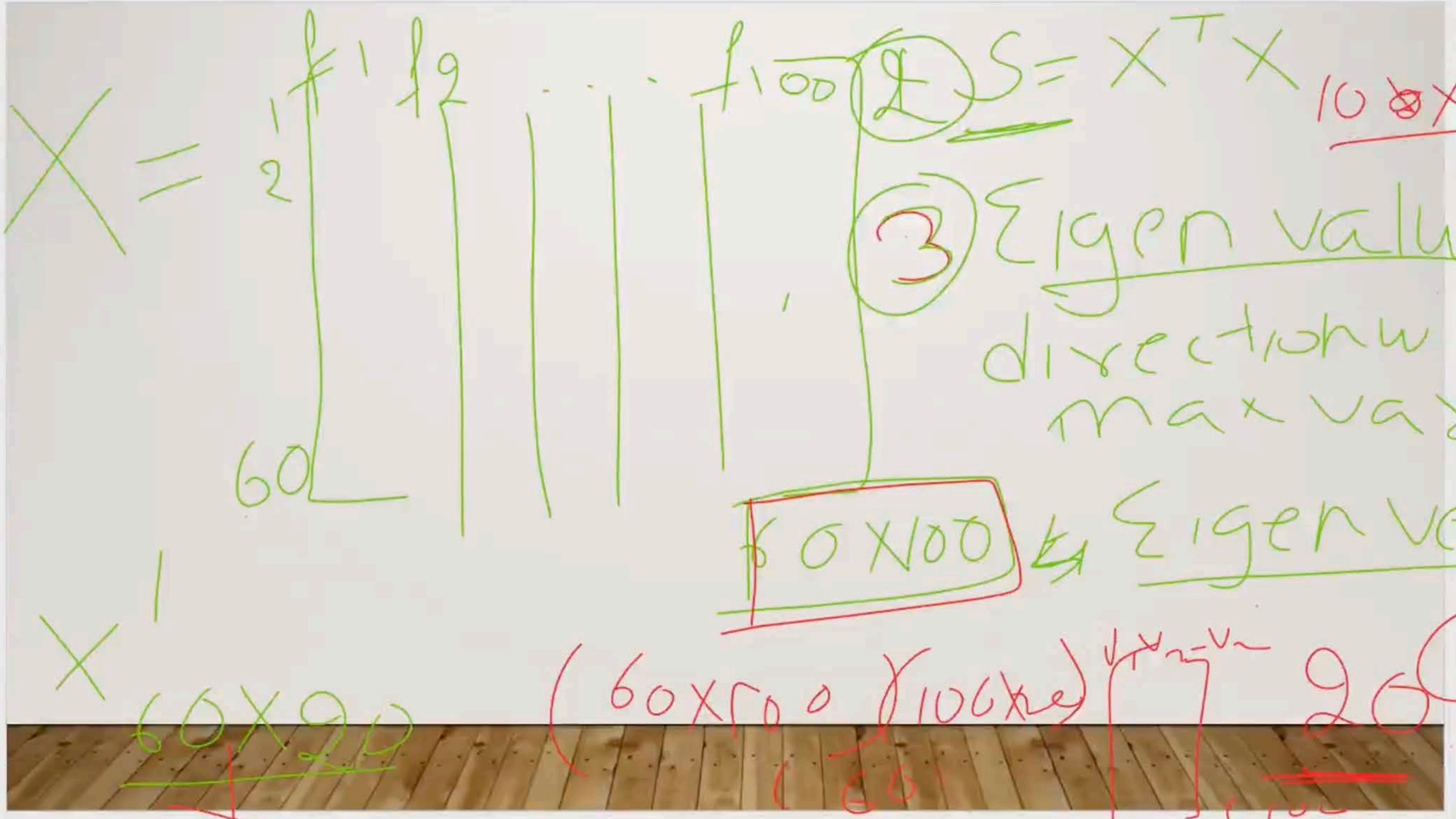
$S = X^T X$

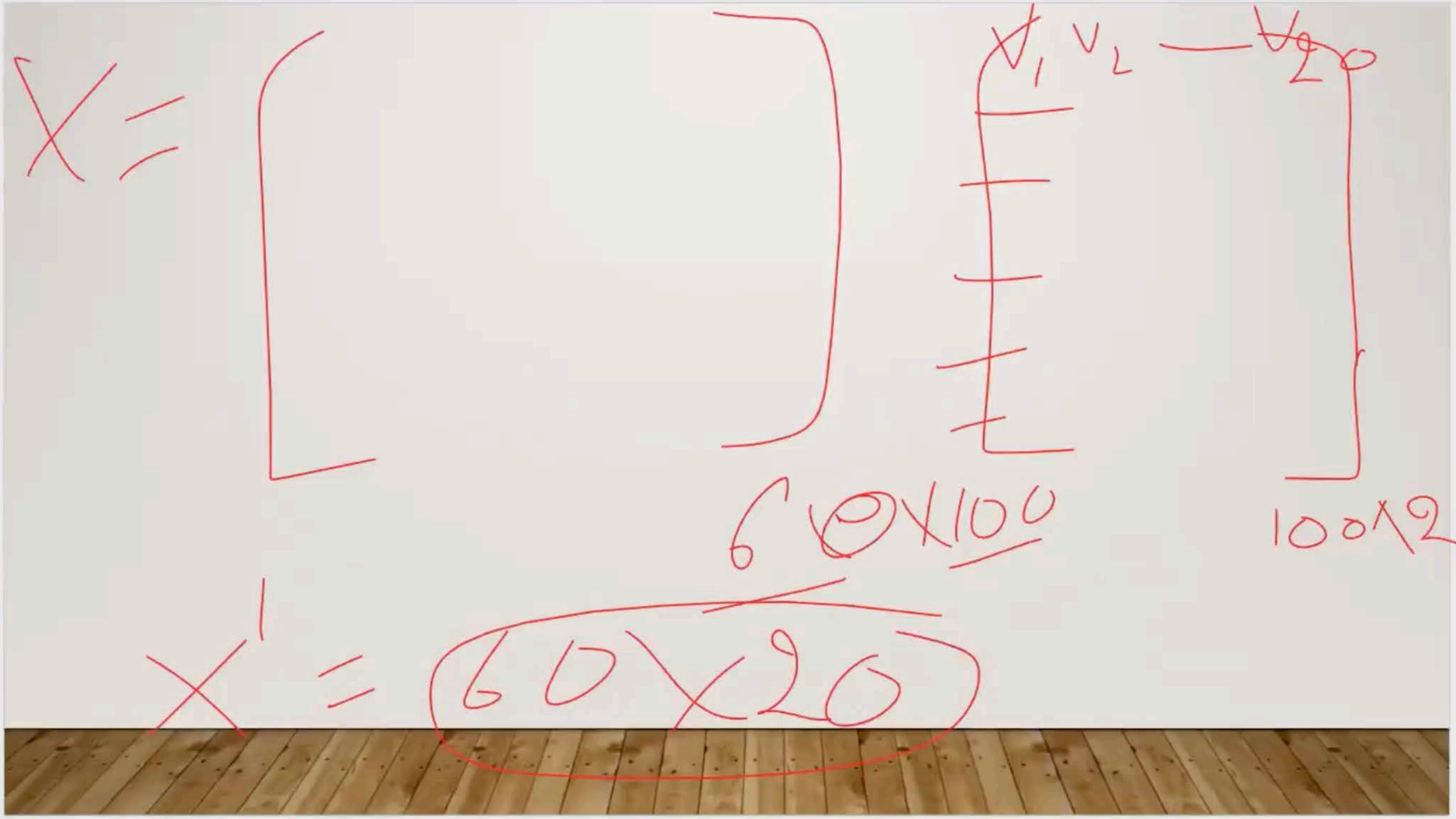
$X = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}_{2 \times 3}$

$(3 \times 2)(2 \times 3)$

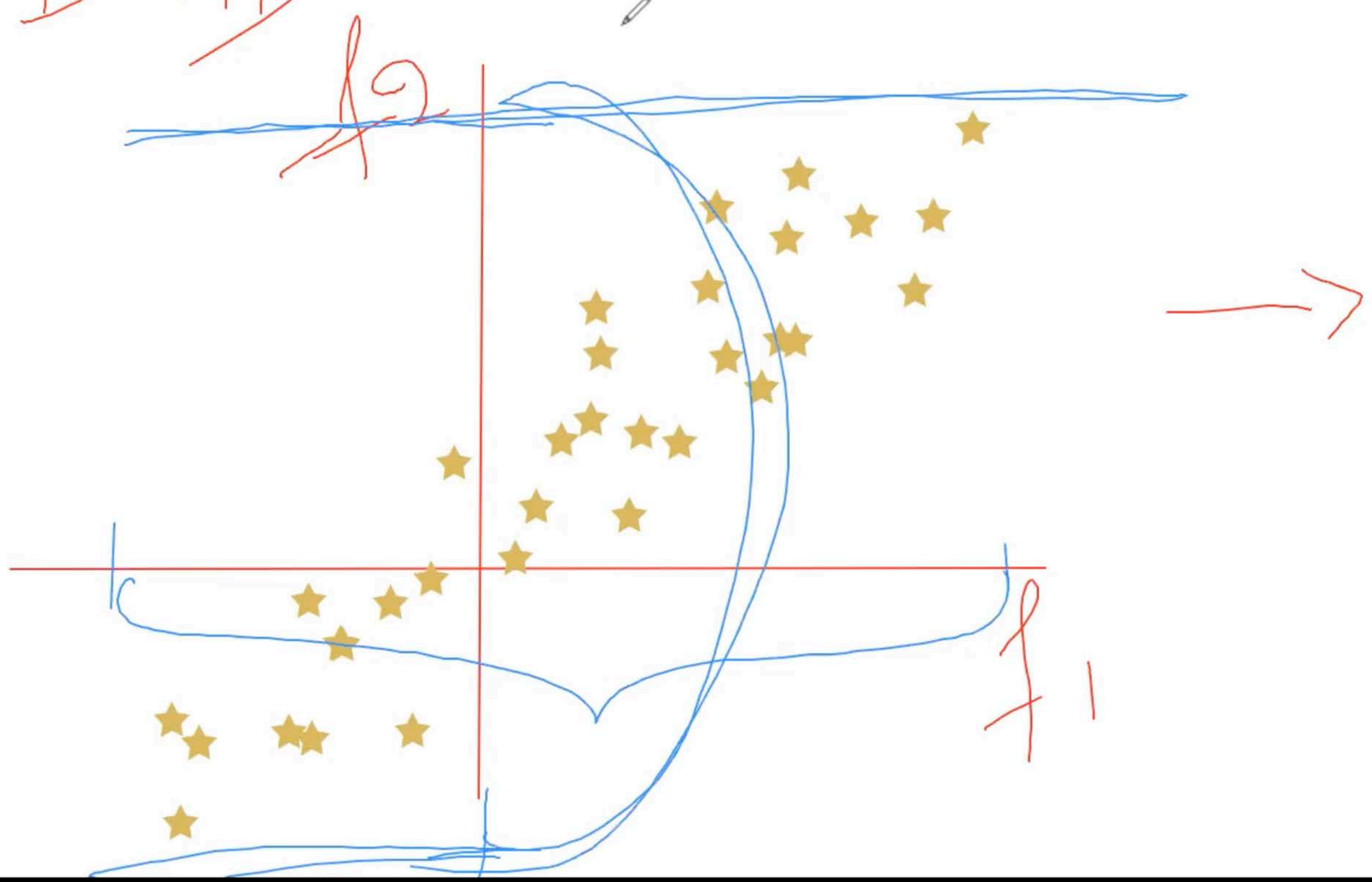
3×3

$X^T = \begin{bmatrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{bmatrix}_{3 \times 2}$


X = f1 f2 ... f100
60
S = X^T X
100 X 100
3 Eigen value
direction with
max vas
60 X 100
Eigen vecta
X^1
60 X 20
20
100


X =
V1 V2 V20
60X100
100X20
X' = 60X20

2D→1D



20 March 2021, 5:24 PM

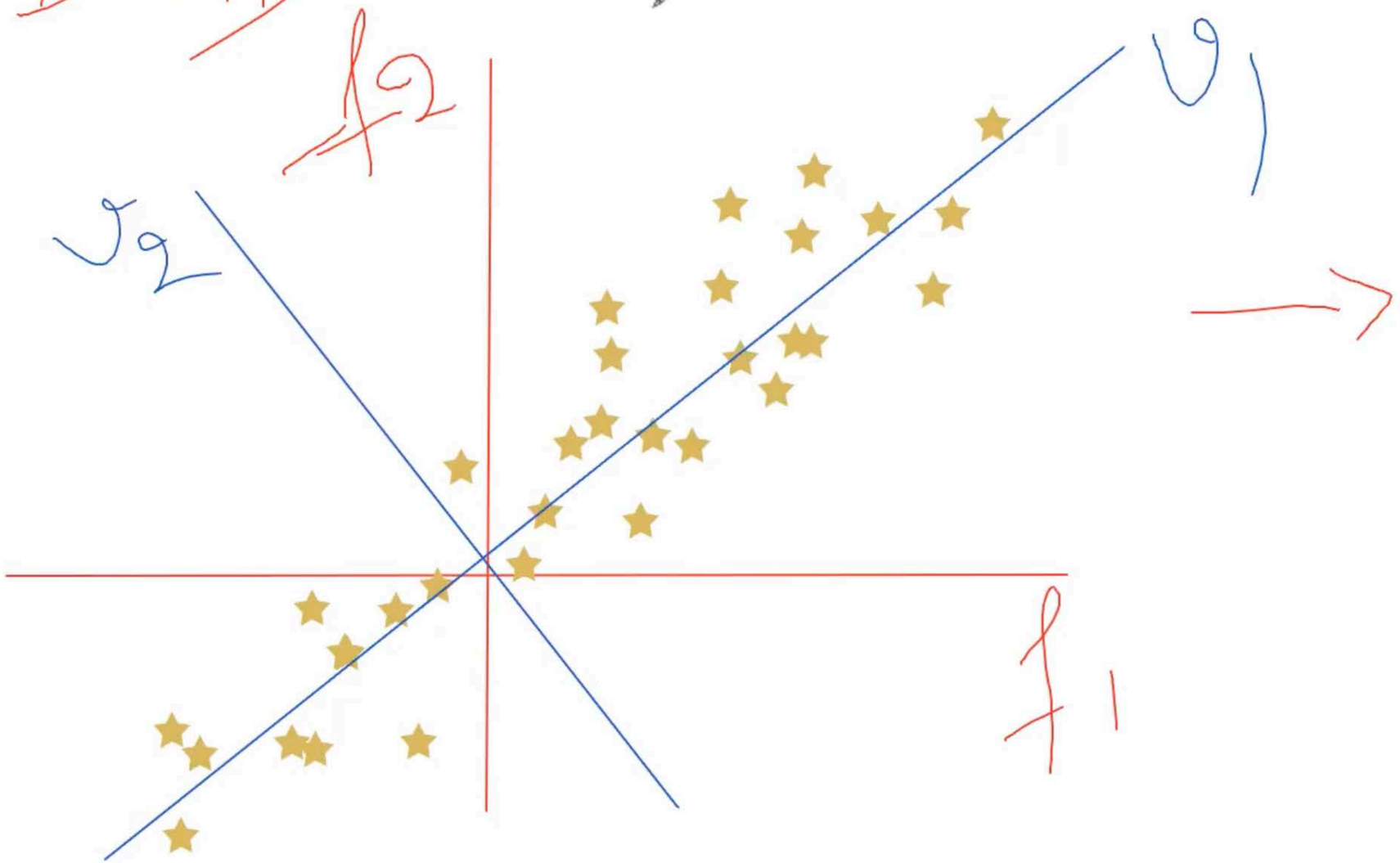
PCA technology (maximum variance feature){example of 60x100 —> 60x20 feature reduction say dimensions reduction}

1. take data set in array form
2. find covariance of that matrix
3. find eigen value and corresponding eigen vector
4. take eigen vector corresponding to top 20 eigen value
5. compute X-transpose of input matrix (dot product of input matrix{60x100} and eigne vectors matrix{100x20})

—> covariance = X(tranpose) * X {matrix multiplication get 100x100}
—> column standardization = the means of a column should be zero.
—> eigen value give the direction with maximum variance. {variance is also understands as spread.}
—> eigen vector give vector corresponding to that eigen value(that have maximum variance).
—> no of eigen value ,eigen vector = no of column(each column represent one vector or say one feature).
—> make a matrix of those eigen vectors{100x100 —>100x20}

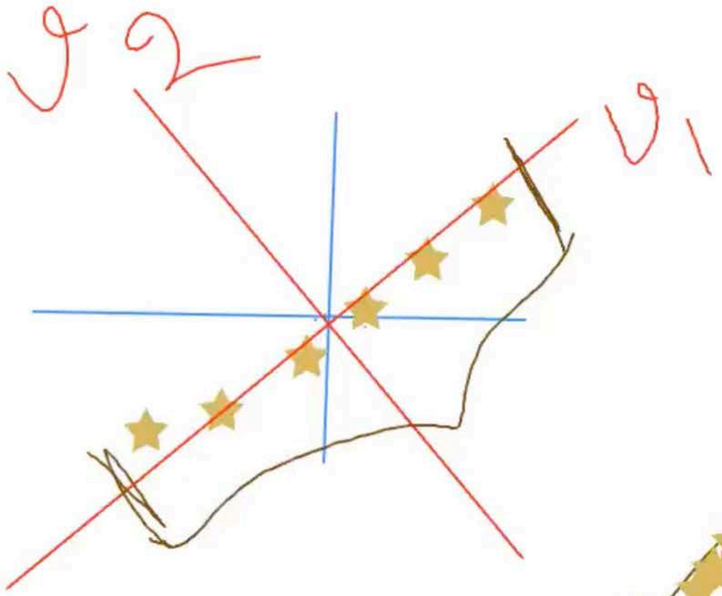
—> no of eigen vector = no of dimension
—> every eigen vector(corresponding to different dimension) is perpendicular to each other(this is the feature of eigen vector.)

2D → 1D



2D
2 eigen

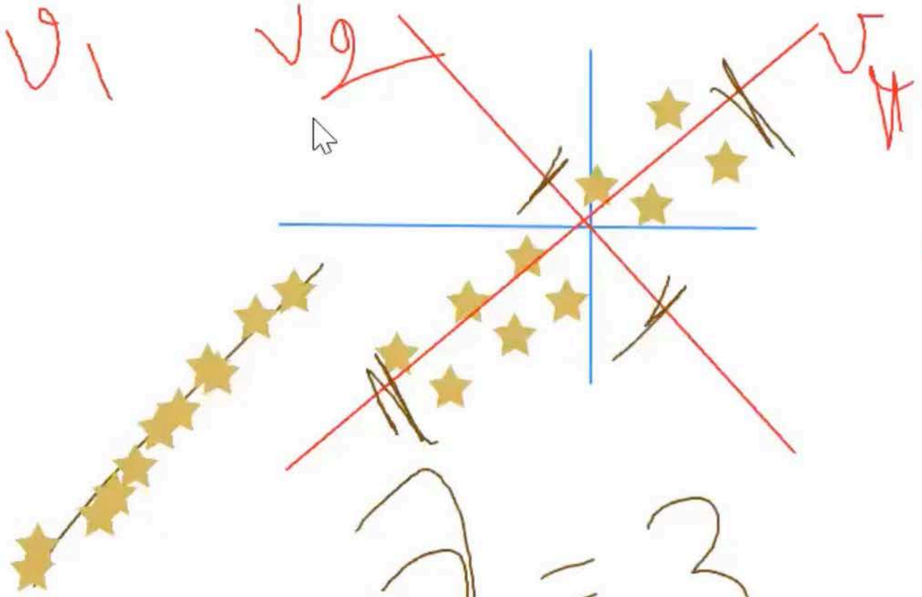
2



$\lambda_1 = 3$

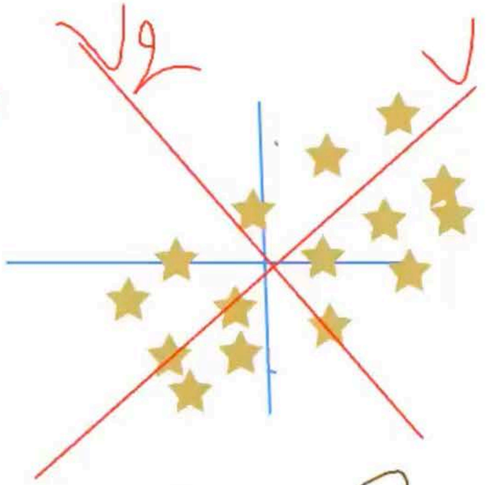
$\lambda_2 = 0$

$\frac{\lambda_1}{\lambda_1+\lambda_2} = 1$



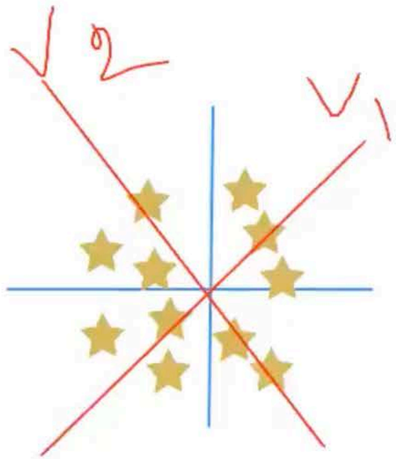
$\lambda_1 = 3$

$\lambda_2 = 1$



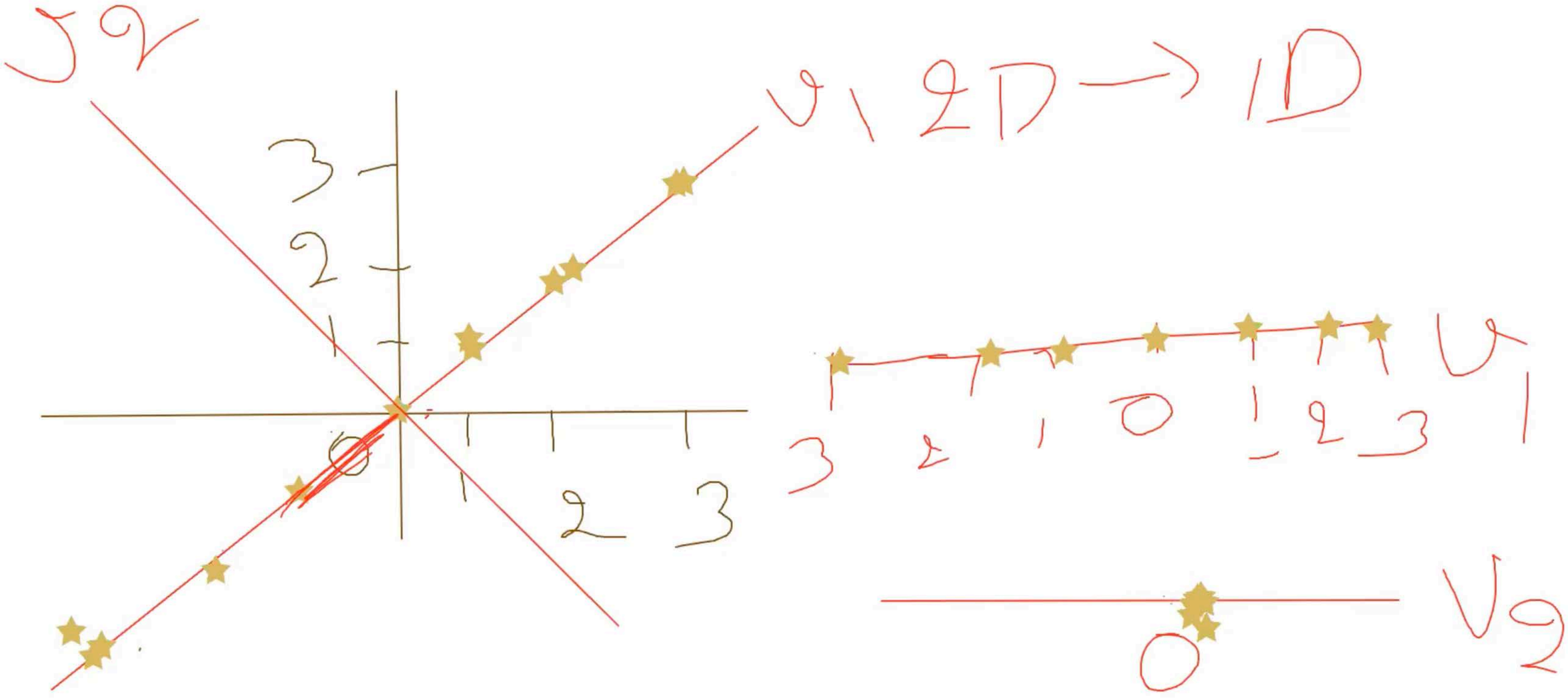
$\lambda_1 = 3$

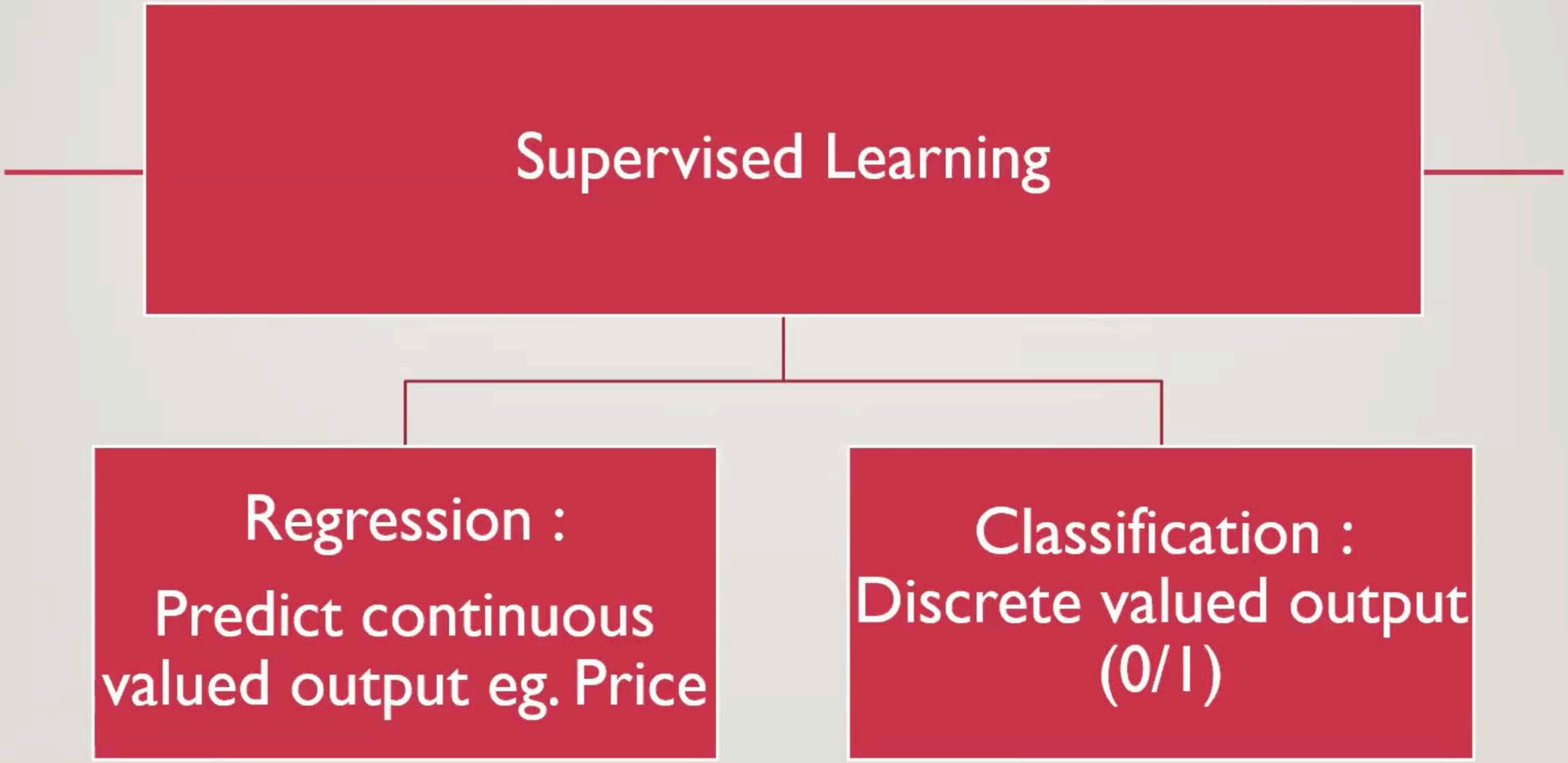
$\lambda_2 = 2$



$\lambda = 3$

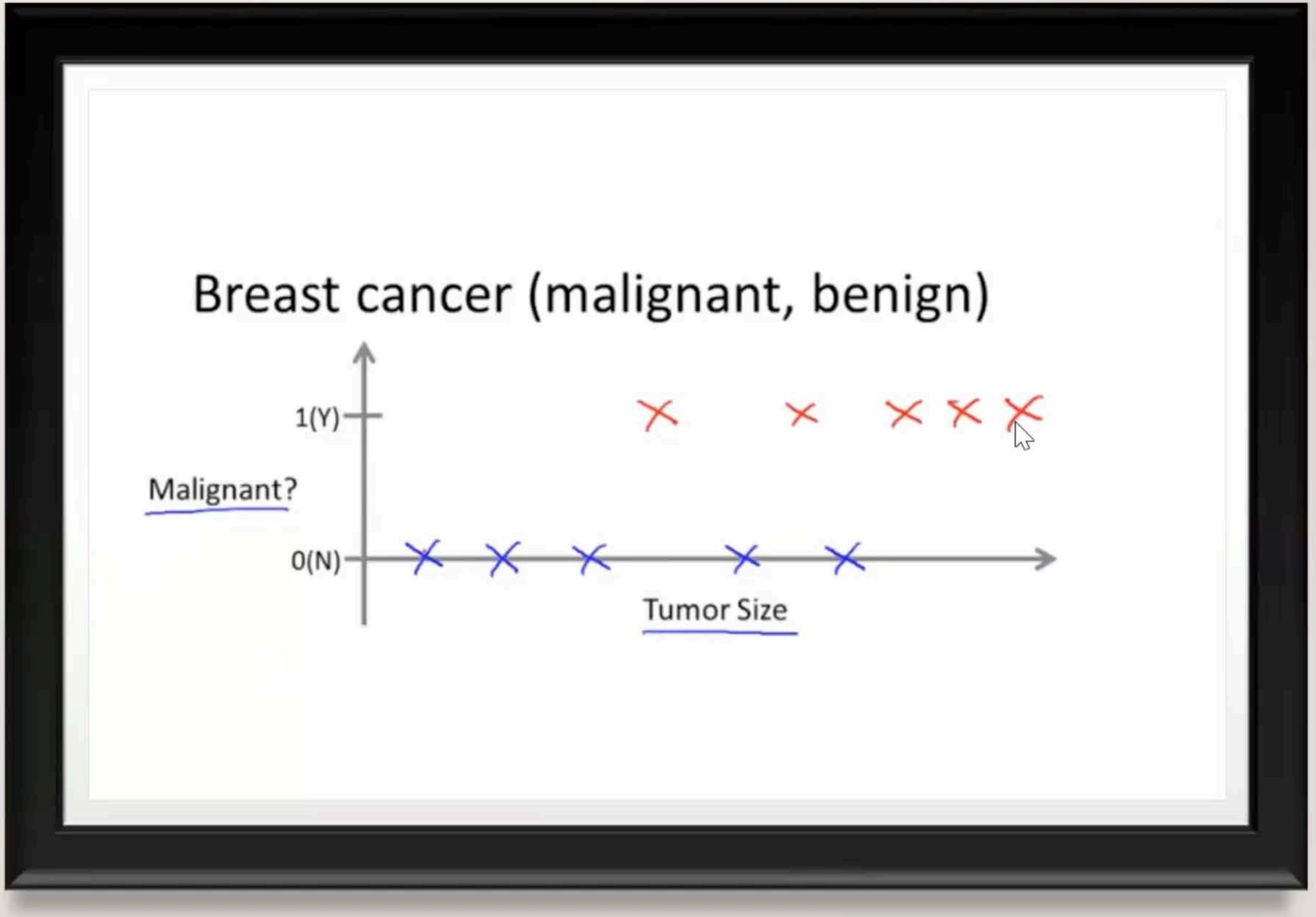
$\lambda = 3$


V2
3
2
1
0
1
2
3
V1 2D → 1D
3
2
1
0
1
2
3
V1
V2
0

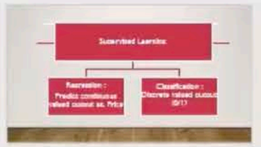

Supervised Learning
Regression :
Predict continuous valued output eg. Price
Classification :
Discrete valued output (0/1)

CLASSIFICATION

BREAST CANCER

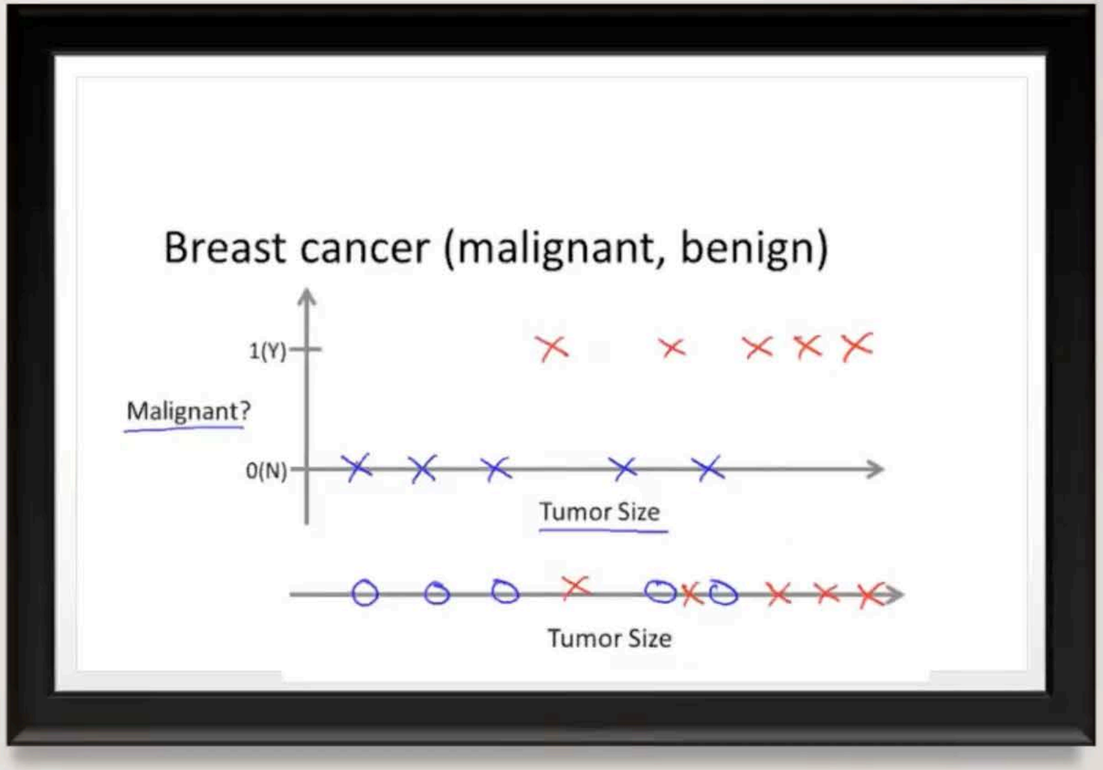


Select | Draw with Touch | Eraser | Lasso Select — Tools
Pens | Add Pen
Ruler — Stencils
Ink to Shape | Ink to Math — Convert



CLASSIFICATION

BREAST CANCER



Select | Draw with Touch | Eraser | Lasso Select — Tools

Pens | Add Pen

Ruler — Stencils

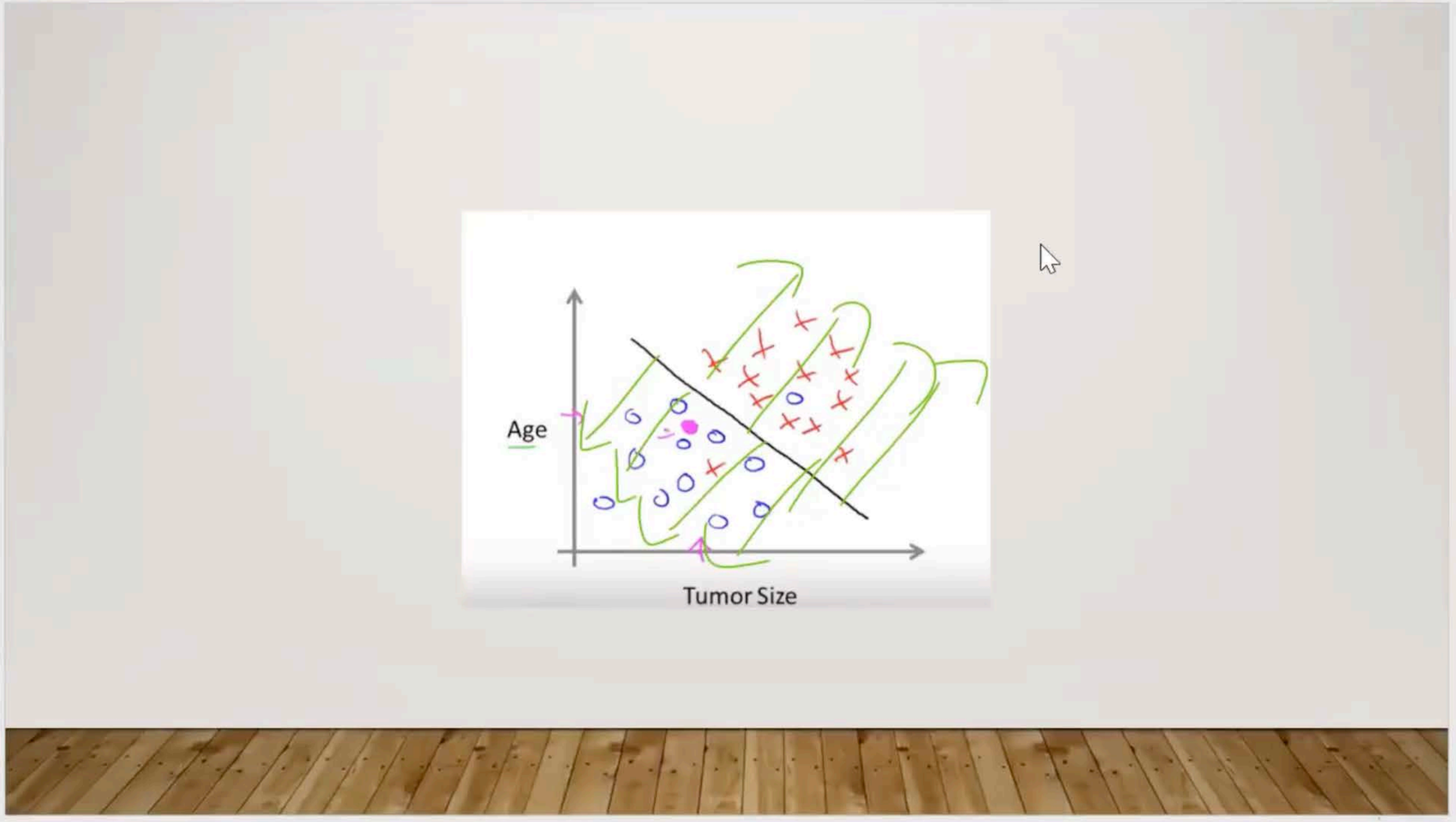
Ink to Shape | Ink to Math — Convert

Select | Draw with Touch | Eraser | Lasso Select — Tools

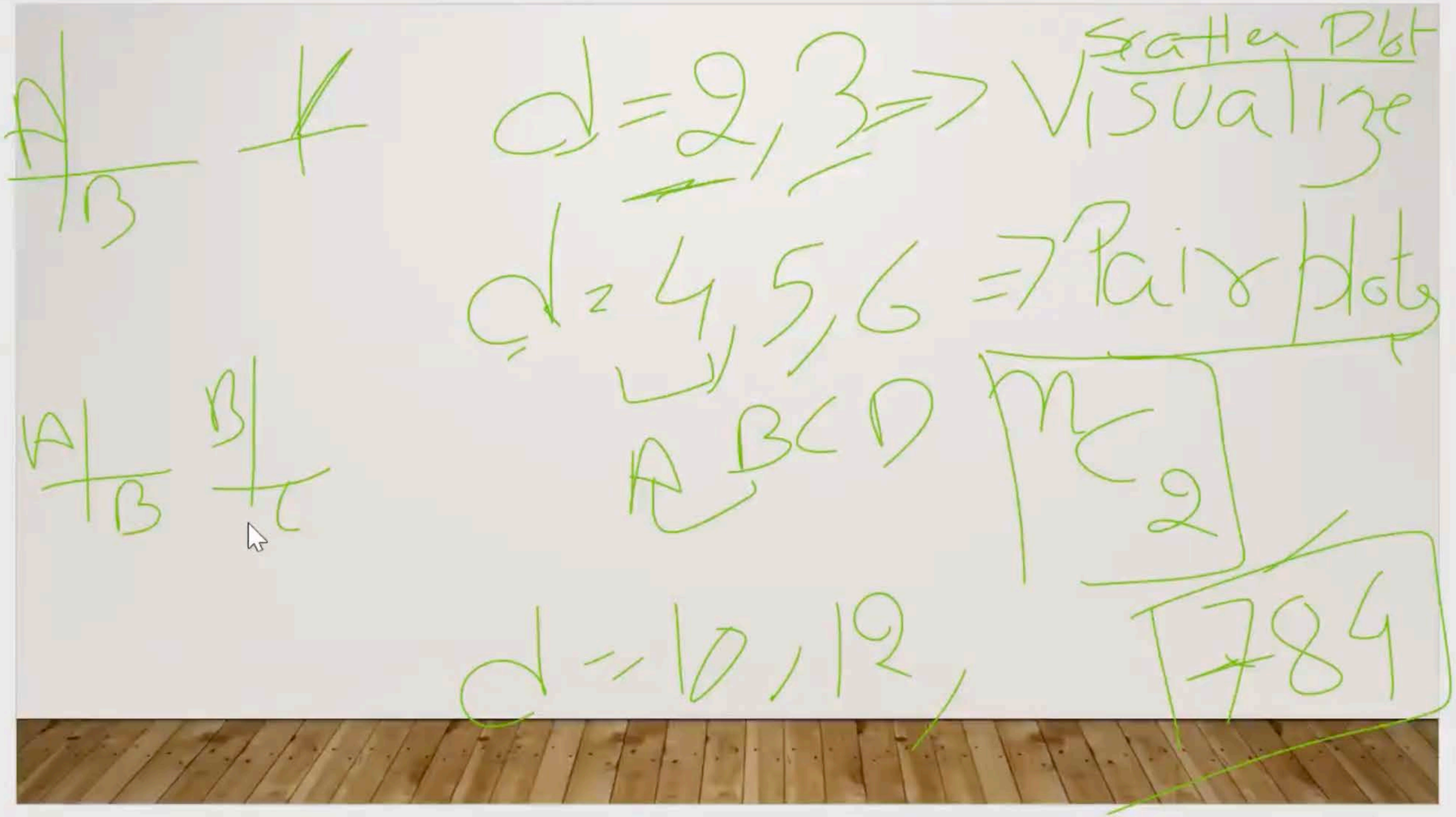
Pens | Add Pen

Ruler — Stencils

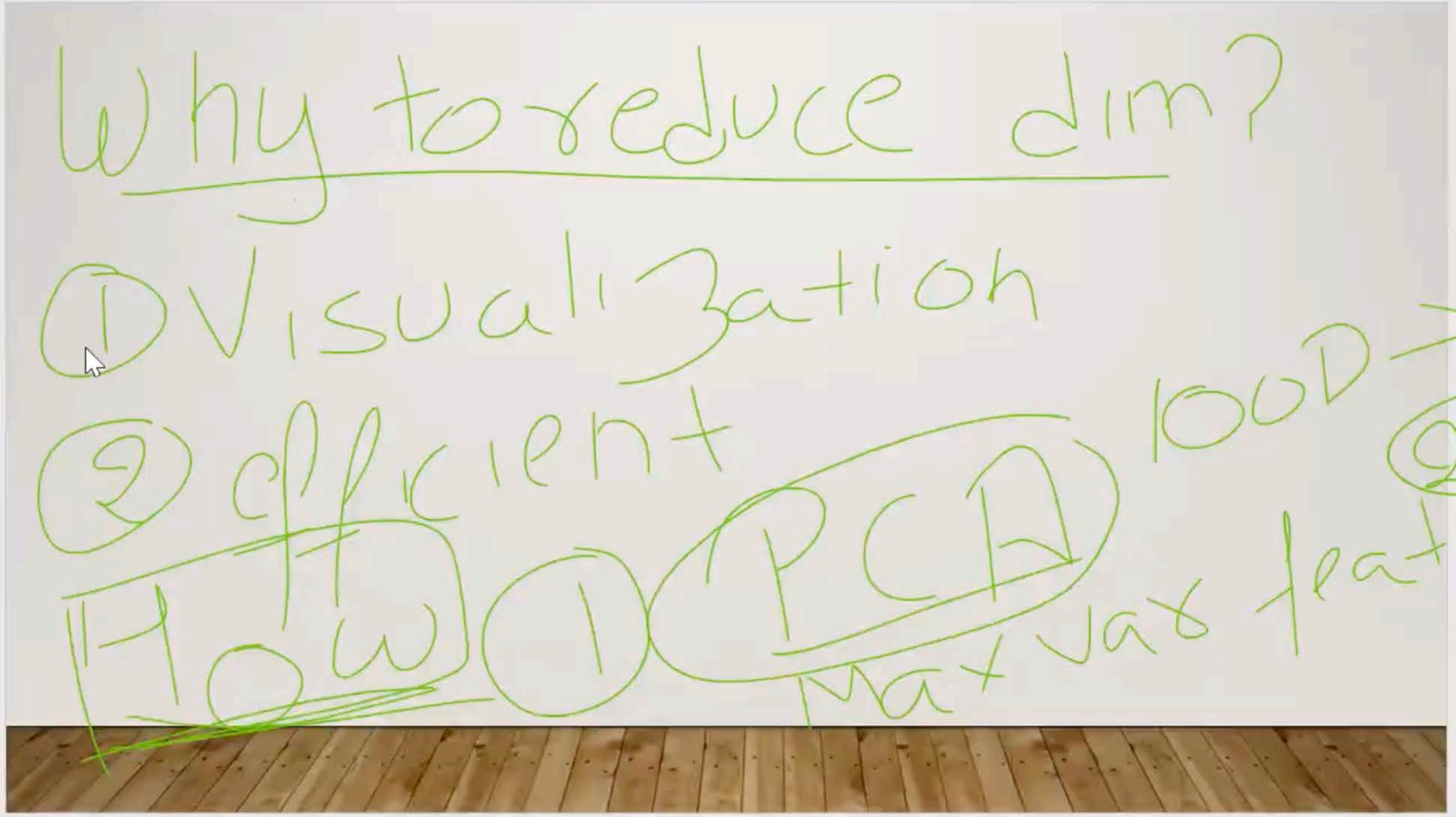
Ink to Shape | Ink to Math — Convert



Select Draw with Touch Eraser Lasso Select — Tools
Add Pen — Pens
Ruler — Stencils
Ink to Shape Ink to Math — Convert



Select | Draw with Touch | Eraser | Lasso Select — Tools
Pens | Add Pen
Ruler — Stencils
Ink to Shape | Ink to Math — Convert



Select | Draw with Touch | Eraser | Lasso Select — Tools
Add Pen — Pens
Ruler — Stencils
Ink to Shape | Ink to Math — Convert