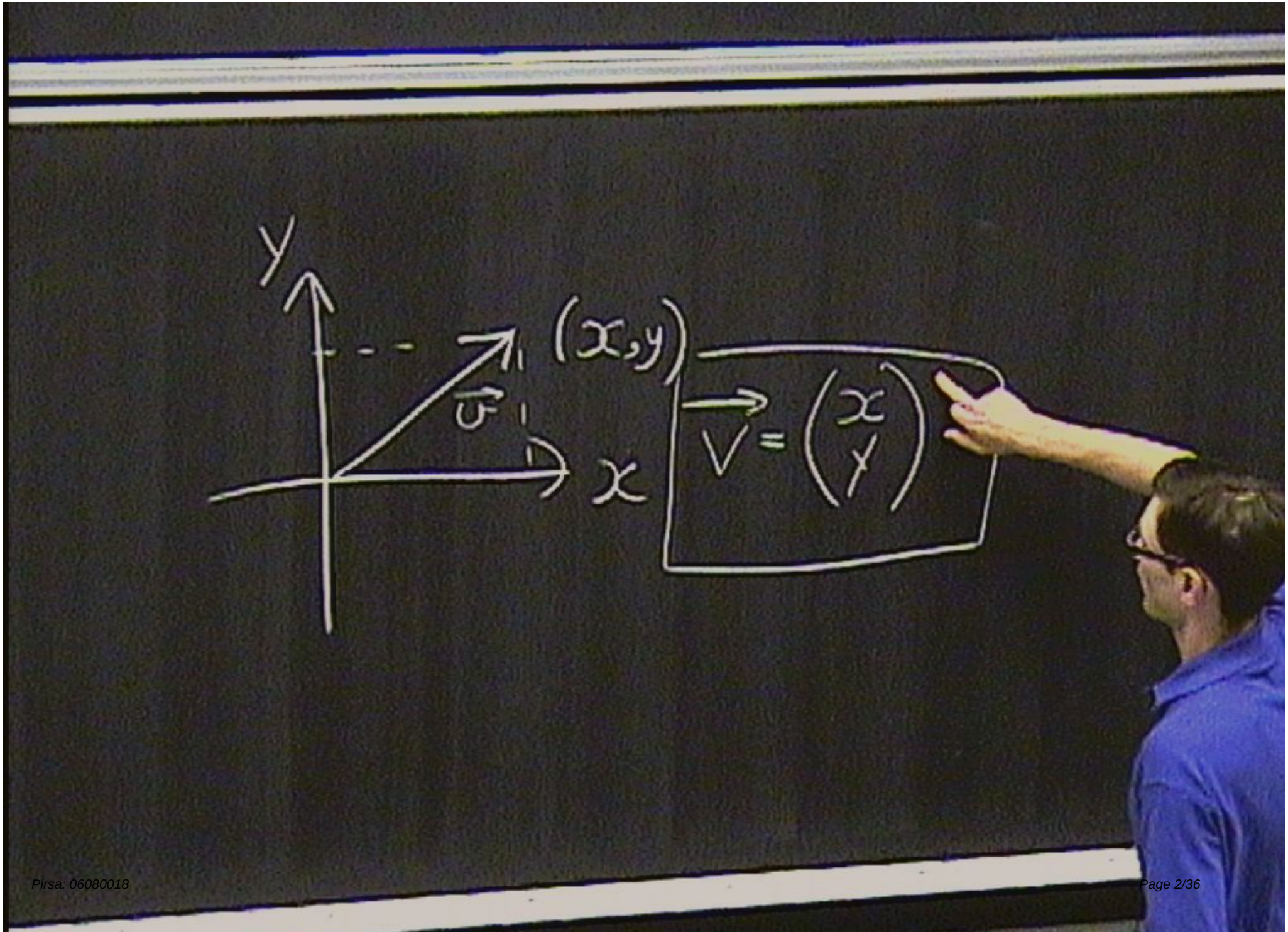
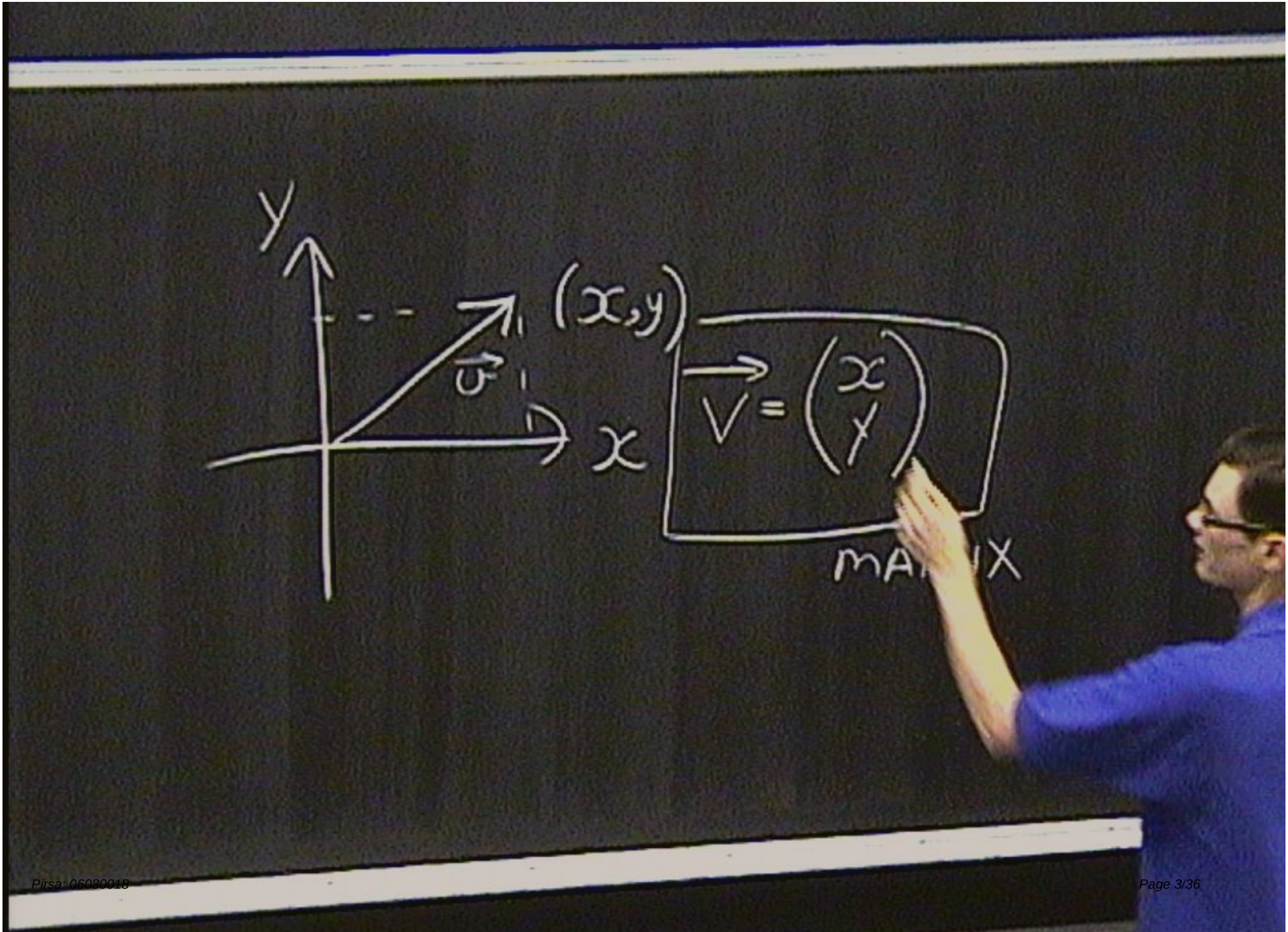
Title: Math Primer - Matrices - Part 1

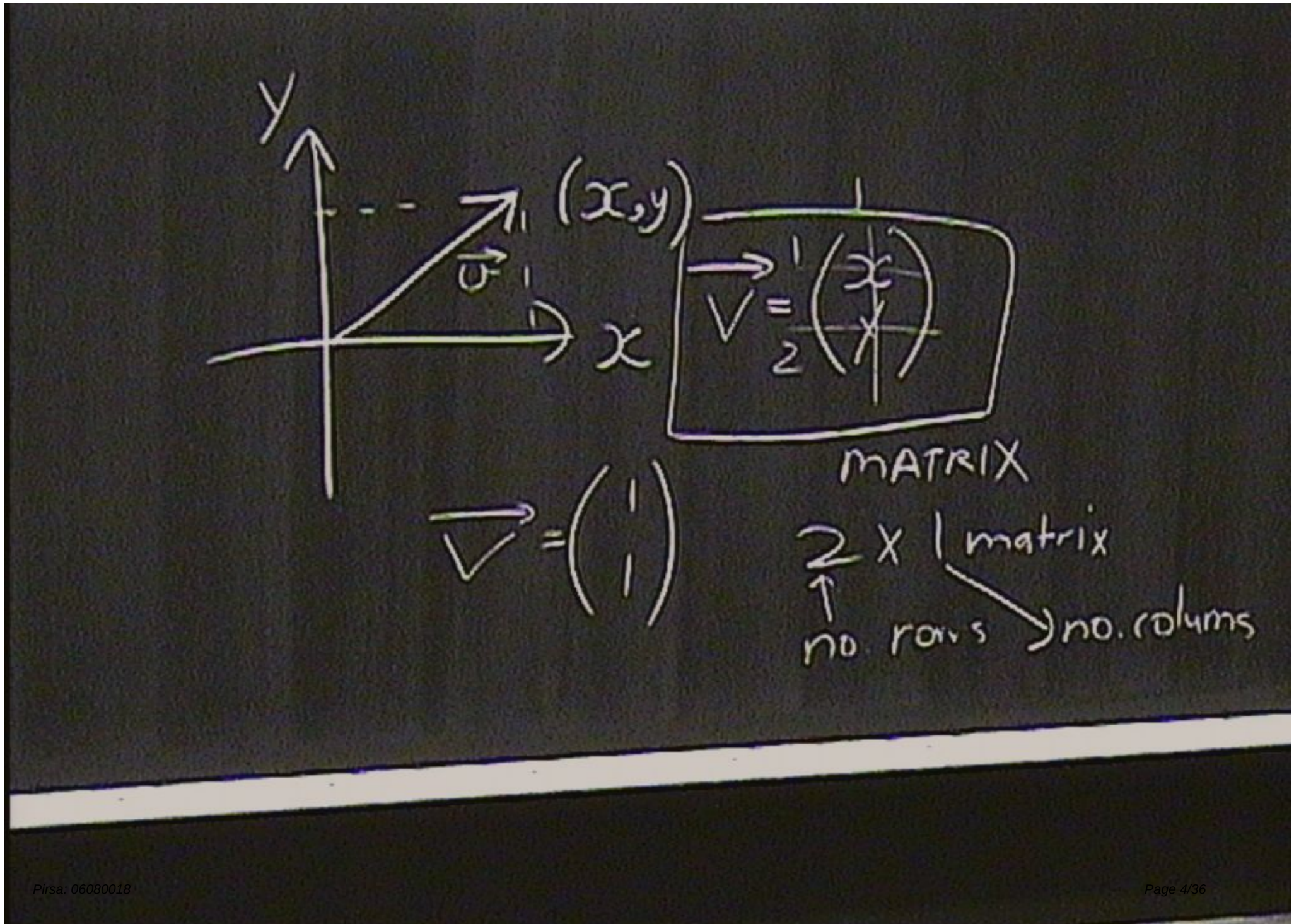
Date: Aug 09, 2006 09:00 AM

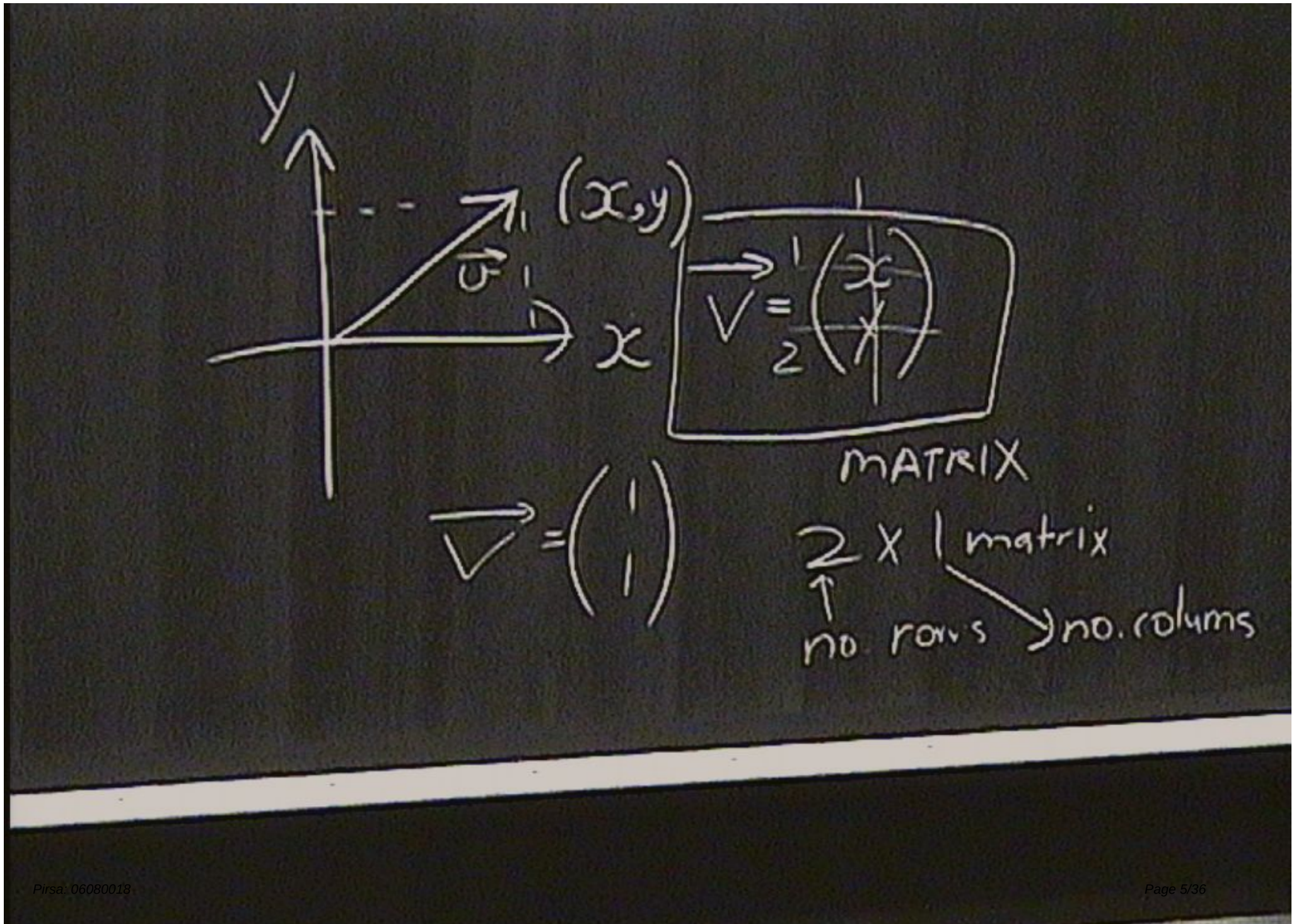
URL: http://pirsa.org/06080018

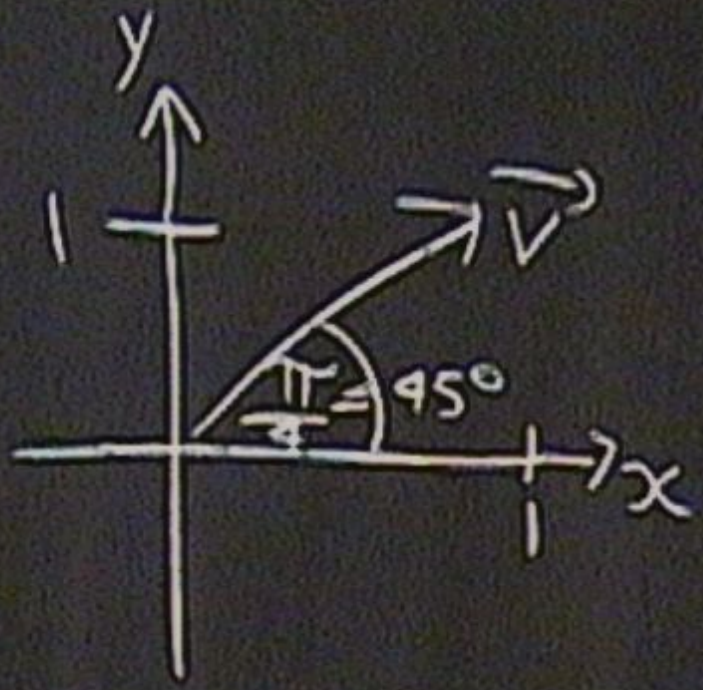
Abstract:

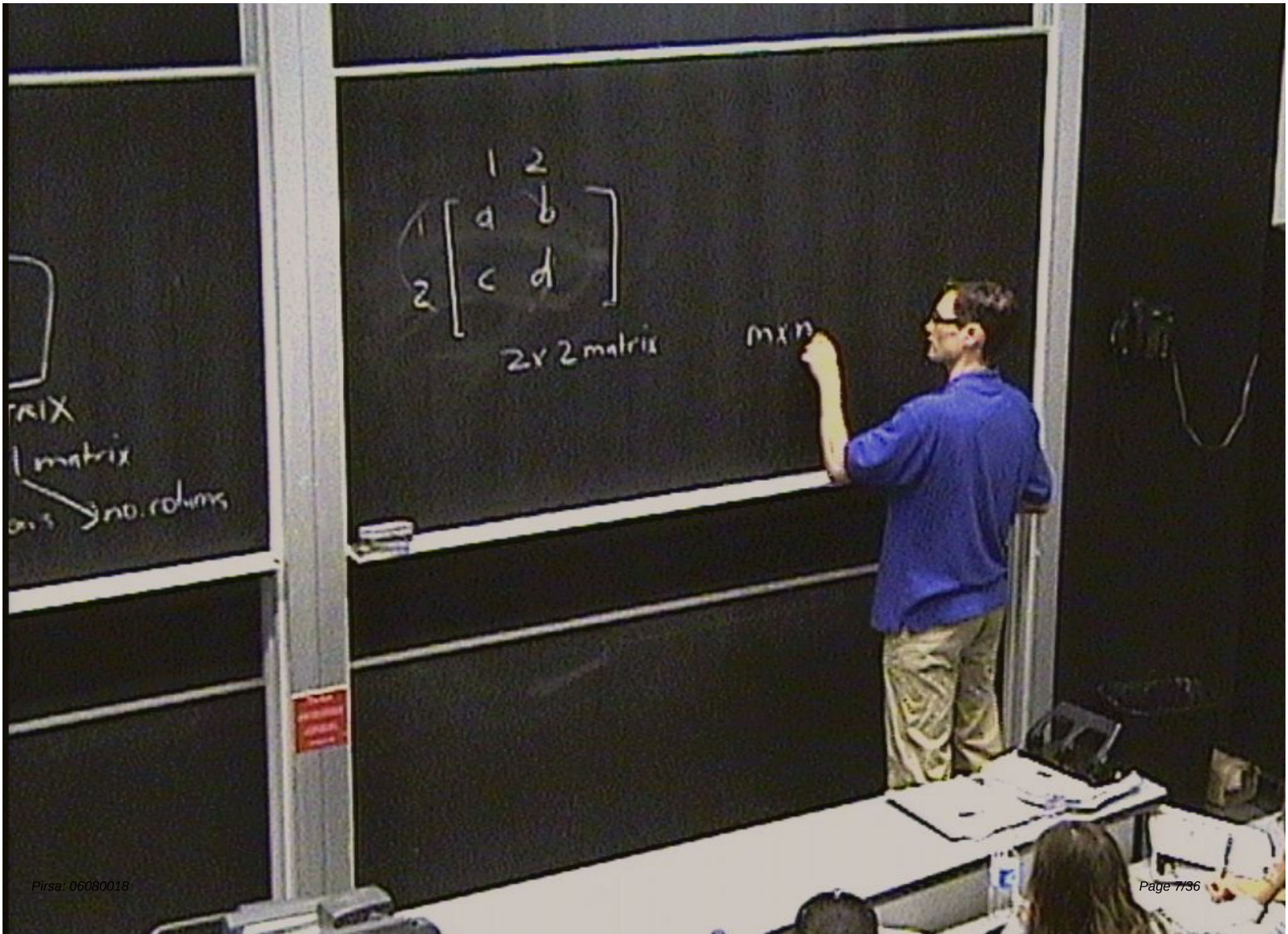

y
(x,y)
θ
x
$\vec{v} = \begin{pmatrix} x \\ y \end{pmatrix}$

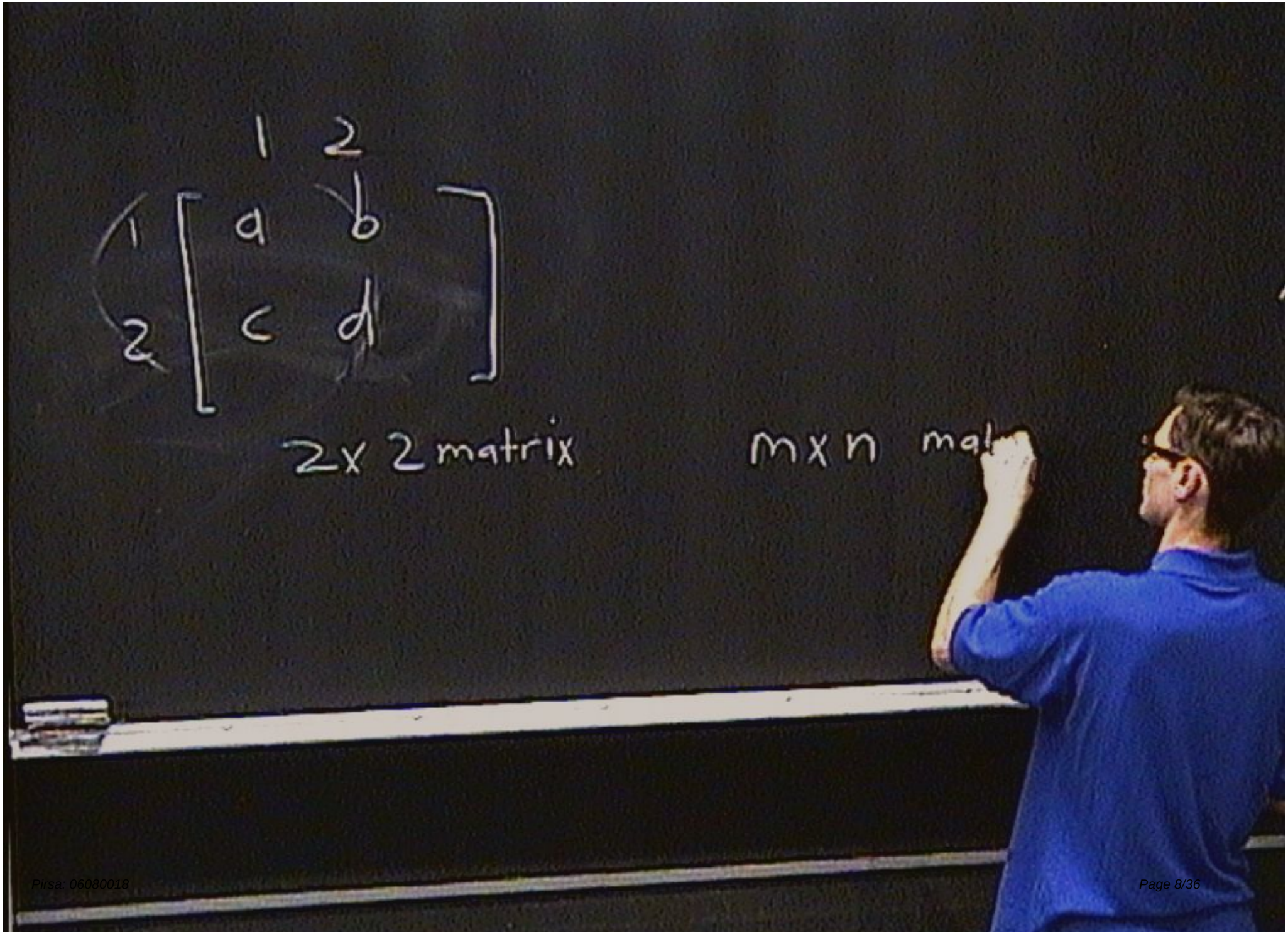

y
(x,y)
x
$\vec{v} = \begin{pmatrix} x \\ y \end{pmatrix}$

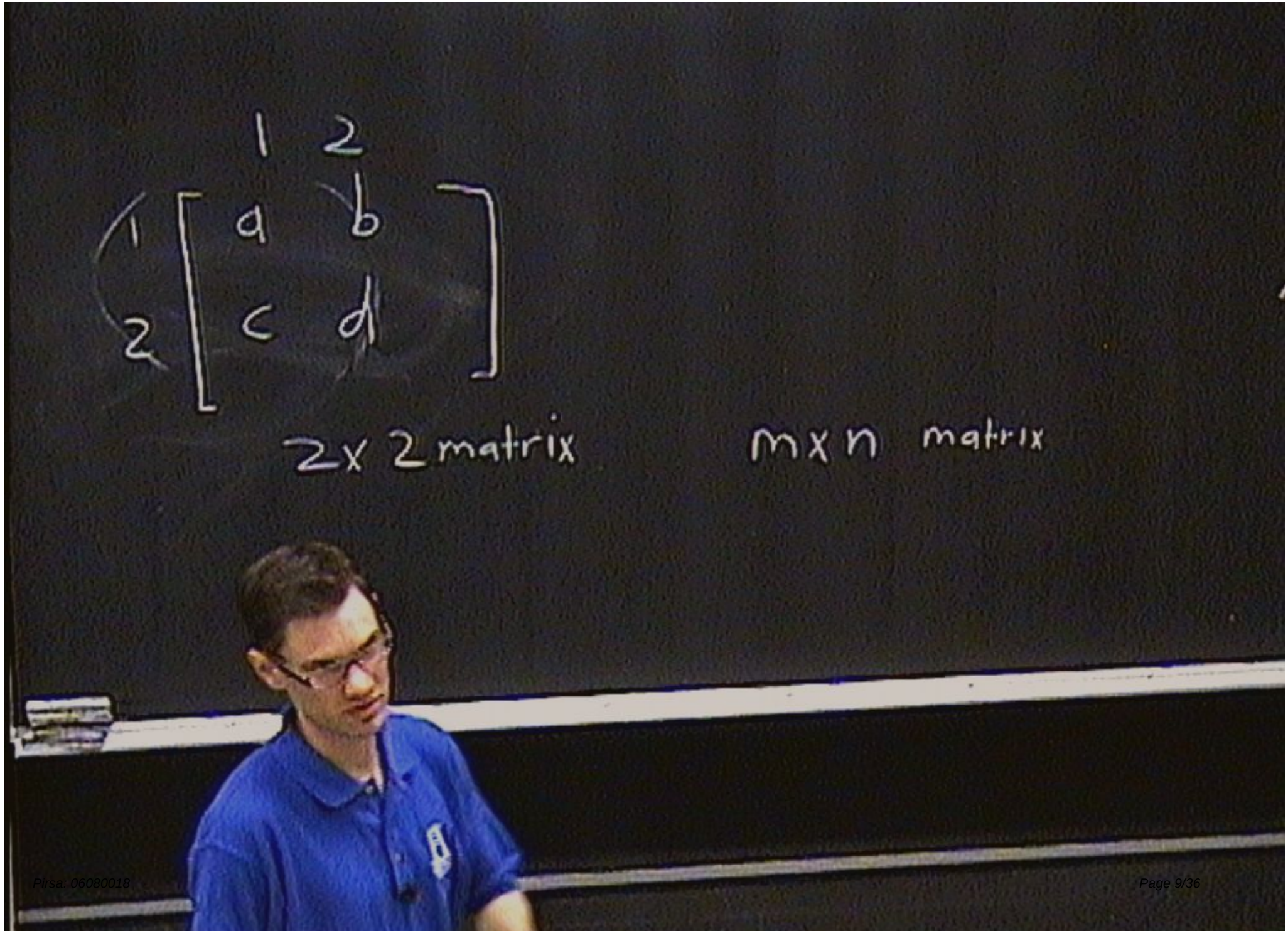

y
(x,y)
x
MATRIX
2 x 1 matrix
no rows
no. columns

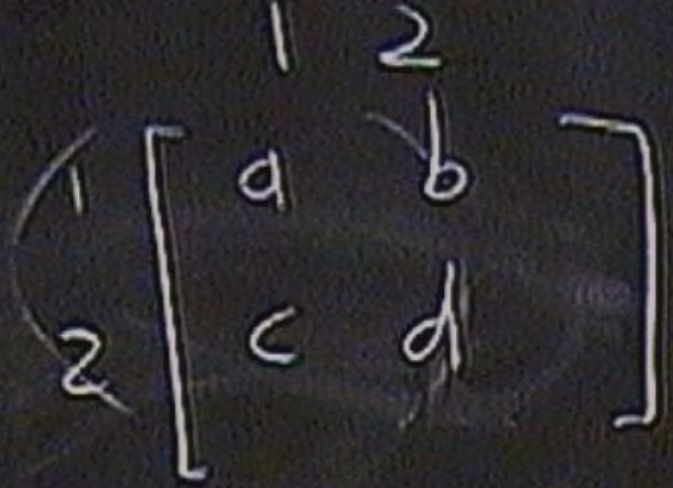

y
(x,y)
x
$\vec{v} = \begin{pmatrix} x \\ y \end{pmatrix}$
MATRIX
$\vec{v} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$
2 x 1 matrix
no. rows
no. columns


y
1
$\vec{v}$
$\frac{\pi}{4}$ = 45°
x
1


1 2
1 a b
2 c d
2x2 matrix
mxn
matrix
no. rows

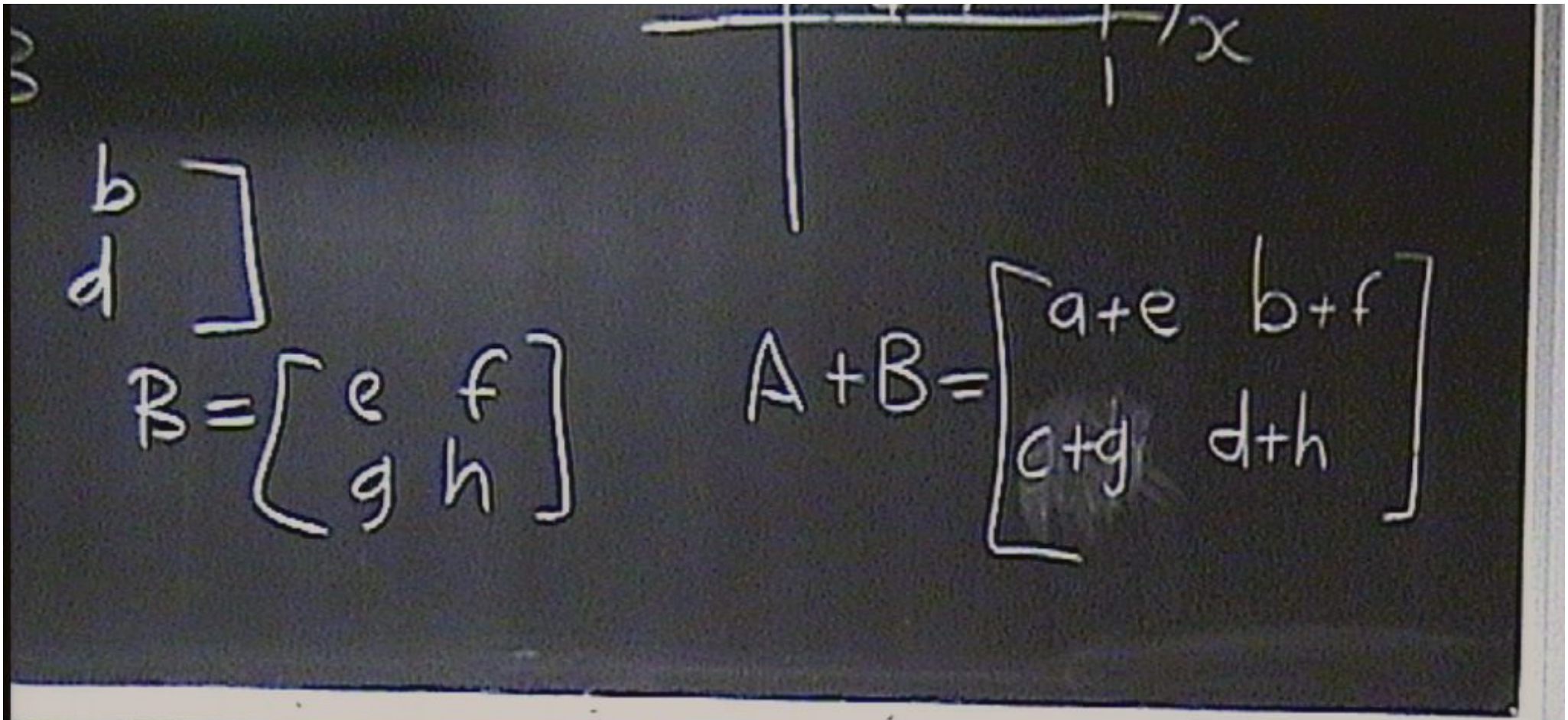

1 2
1
2
a b
c d
2x 2 matrix
m x n


1 2
1
2
a b
c d
2x2 matrix
mxn matrix



2x2 matrix

mxn matrix


x
b
d
B = [e f ; g h]
A+B = [a+e b+f ; c+g d+h]

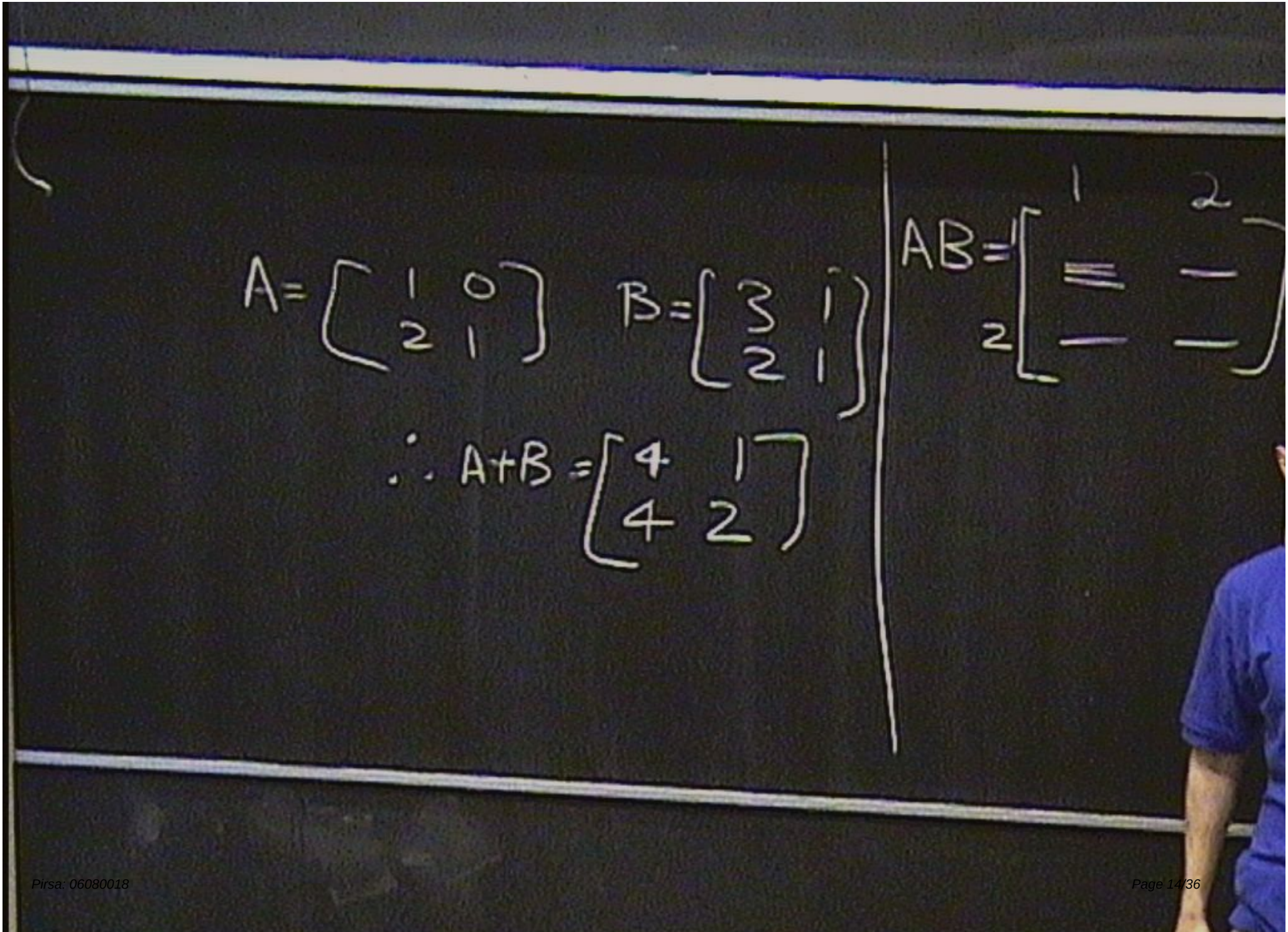
$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$$

$$\therefore A+B = \begin{bmatrix} 4 & 1 \\ 4 & 2 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$$

$$\therefore A+B = \begin{bmatrix} 4 & 1 \\ 4 & 2 \end{bmatrix}$$

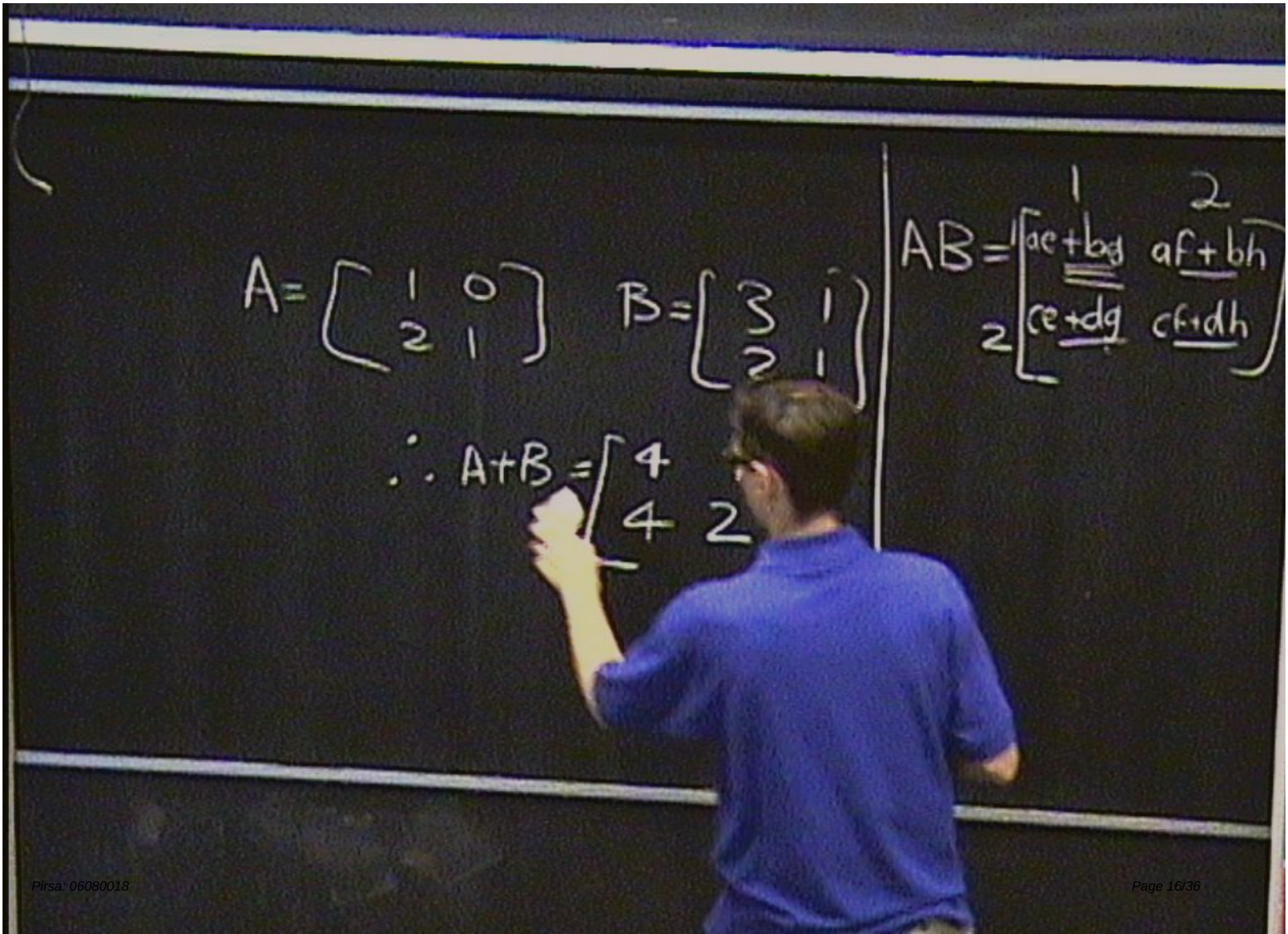
$$AB = \begin{matrix} & 1 & 2 \\ 1 & \_ & \_ \\ 2 & \_ & \_ \end{matrix}$$


A=[1 0; 2 1] B=[3 1; 2 1]
∴ A+B=[4 1; 4 2]
AB=
1 2
1 =
2 =

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$$

$$\therefore A+B = \begin{bmatrix} 4 & 1 \\ 4 & 2 \end{bmatrix}$$

$$AB = \begin{array}{c} \\ 1 \\ 2 \end{array} \begin{array}{c} \begin{array}{cc} 1 & \quad 2 \end{array} \\ \begin{bmatrix} ae+bg & - \\ - & - \end{bmatrix} \end{array}$$


A = [1 0; 2 1]
B = [3 1; 2 1]
∴ A+B = [4 1; 4 2]
AB = [ae+bg af+bh; ce+dg cf+dh]
1 2
1
2

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$$

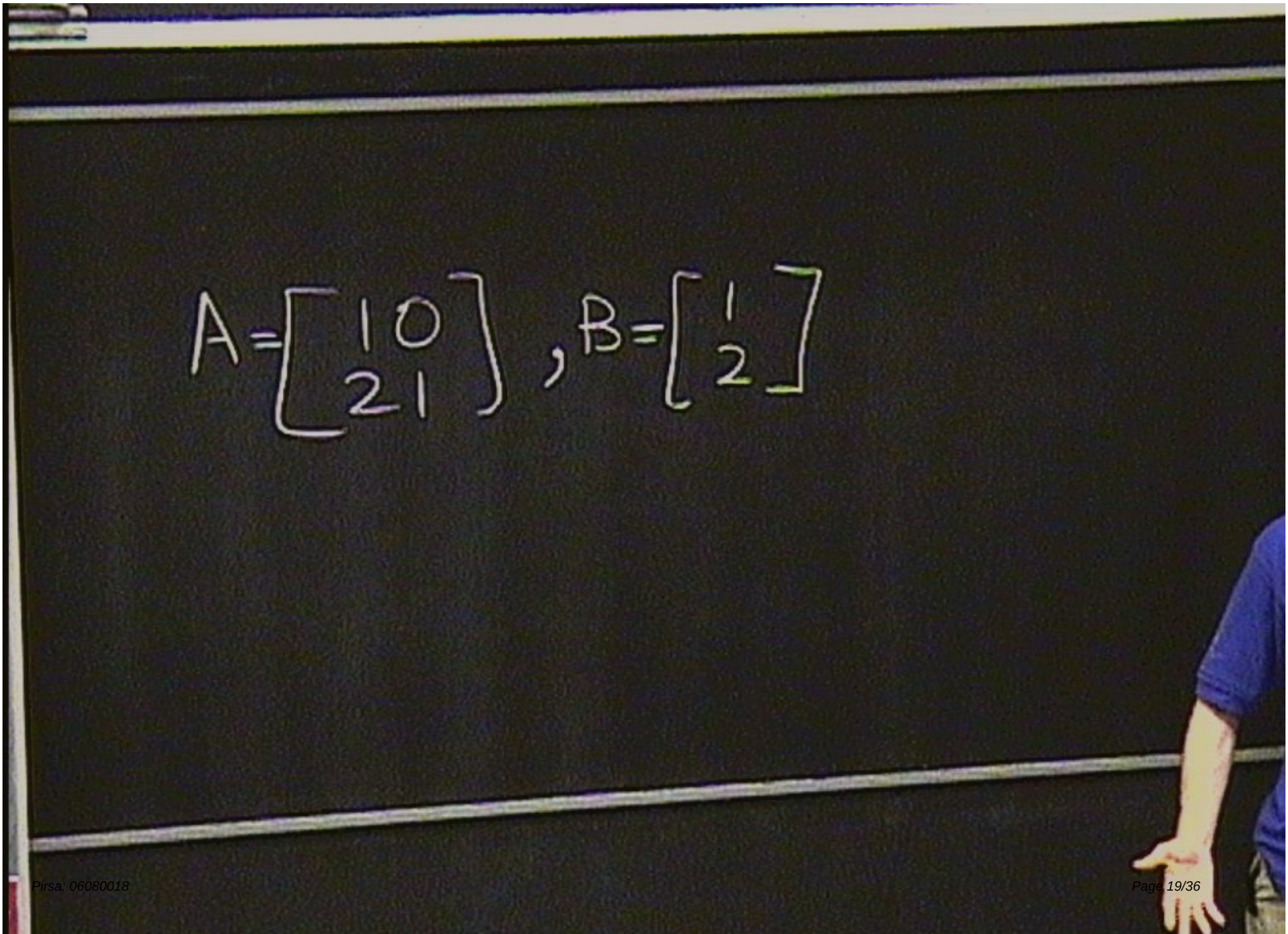
$$\therefore AB = \begin{bmatrix} 3+0 & \text{—} \\ 8 & \end{bmatrix}$$

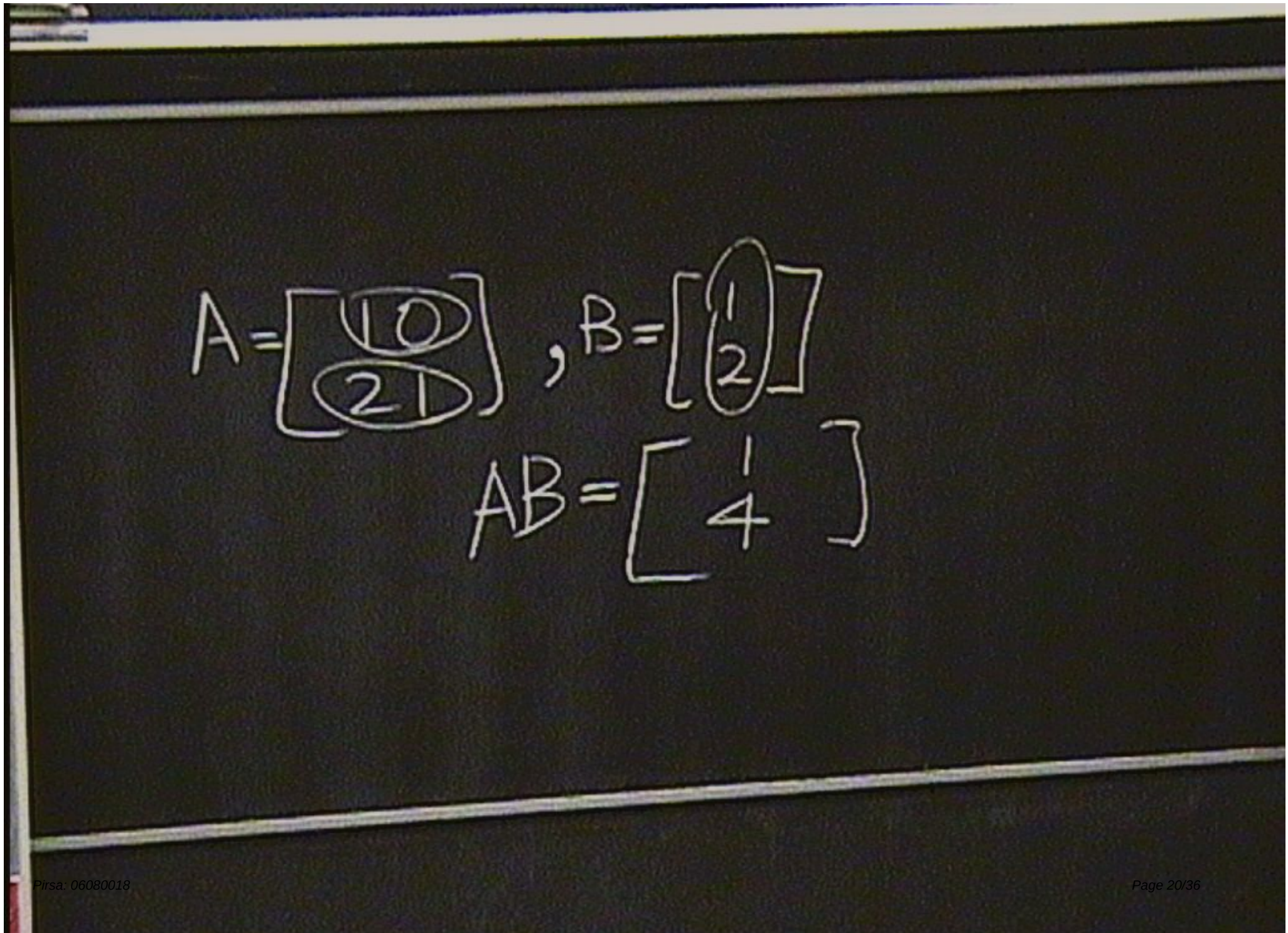
$$AB = \begin{matrix} & \begin{matrix} 1 & \quad 2 \end{matrix} \\ \begin{matrix} 1 \\ 2 \end{matrix} & \begin{bmatrix} ae+bg & af+bh \\ ce+dg & cf+dh \end{bmatrix} \end{matrix}$$

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$$

$$\therefore AB = \begin{bmatrix} 3 & 1 \\ 8 & 3 \end{bmatrix}$$

$$AB = \begin{matrix} 1 \\ 2 \end{matrix} \begin{bmatrix} \overset{1}{ae+bg} & \overset{2}{af+bh} \\ ce+dg & cf+dh \end{bmatrix}$$


A=[1 0 / 2 1], B=[1 / 2]

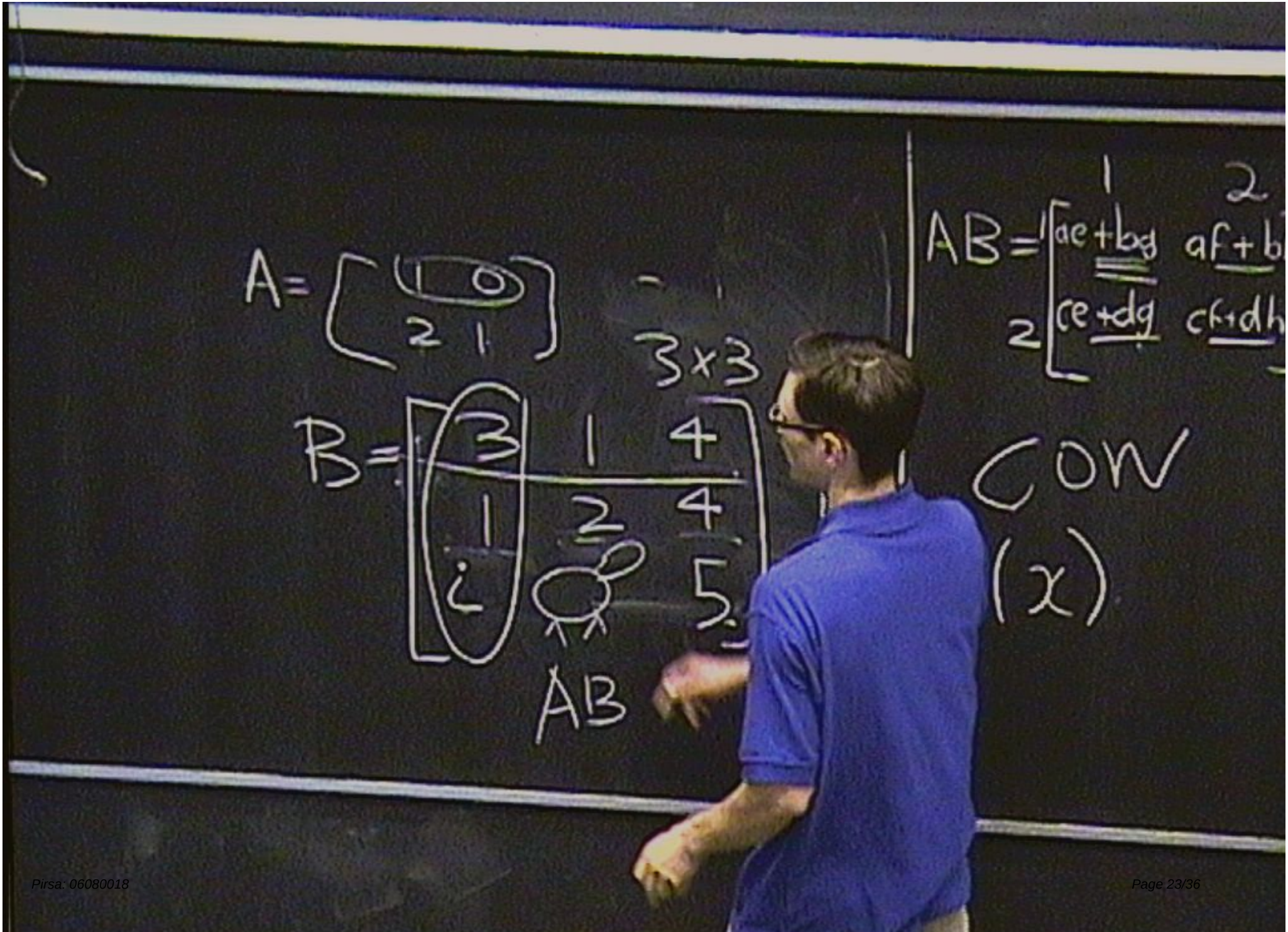

A = [1 0 ; 2 1] , B = [1 ; 2]
AB = [1 ; 4]

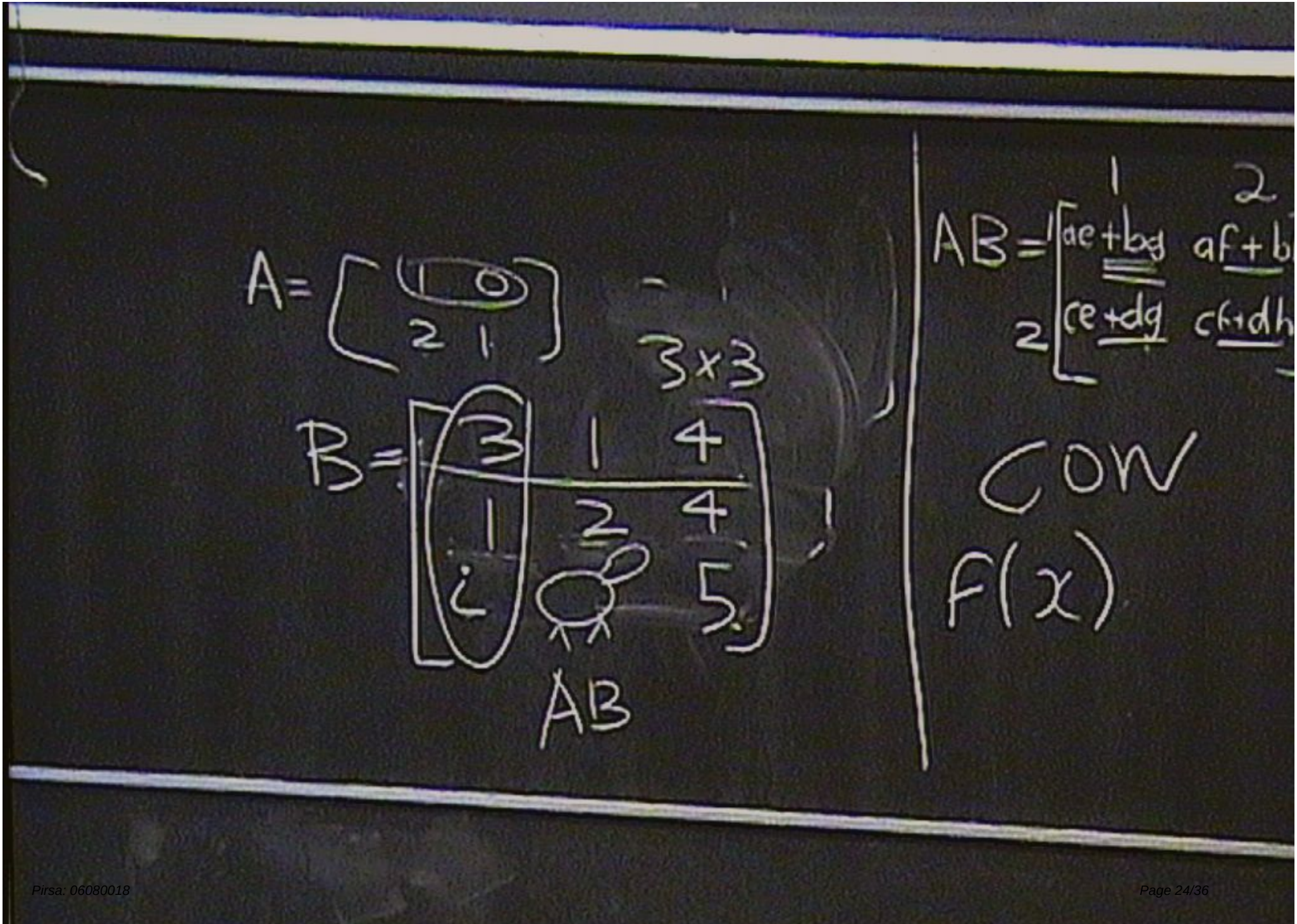
$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

$$AB = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$

$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$

$AB = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$


A=
B=
3x3
AB=
COW
(x)
AB


A = [1 0 / 2 1]
2×2
B = [3 1 4 / 1 2 4 / i 5]
3×3
AB
AB = [ae+bg af+b / ce+dg cf+dh]
1 2
1
2
COW
f(x)

no. columns in 1st matrix = no. rows in 2nd matrix

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$$

2 × 3

$$B = \begin{bmatrix} 3 & 1 & 4 \\ 1 & 2 & 4 \end{bmatrix}$$

3 × 3

$$AB = \begin{bmatrix} ae+bg & af+b \\ ce+dg & cf+dh \end{bmatrix}$$

$$AB = \begin{bmatrix} 3 & 1 & 4 \\ 1 & 2 & 4 \\ ? & & 5 \end{bmatrix}$$

AB

1 2

col

f(x)

no. columns in 1st matrix = no. rows in 2nd matrix

$$A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$$

3×3

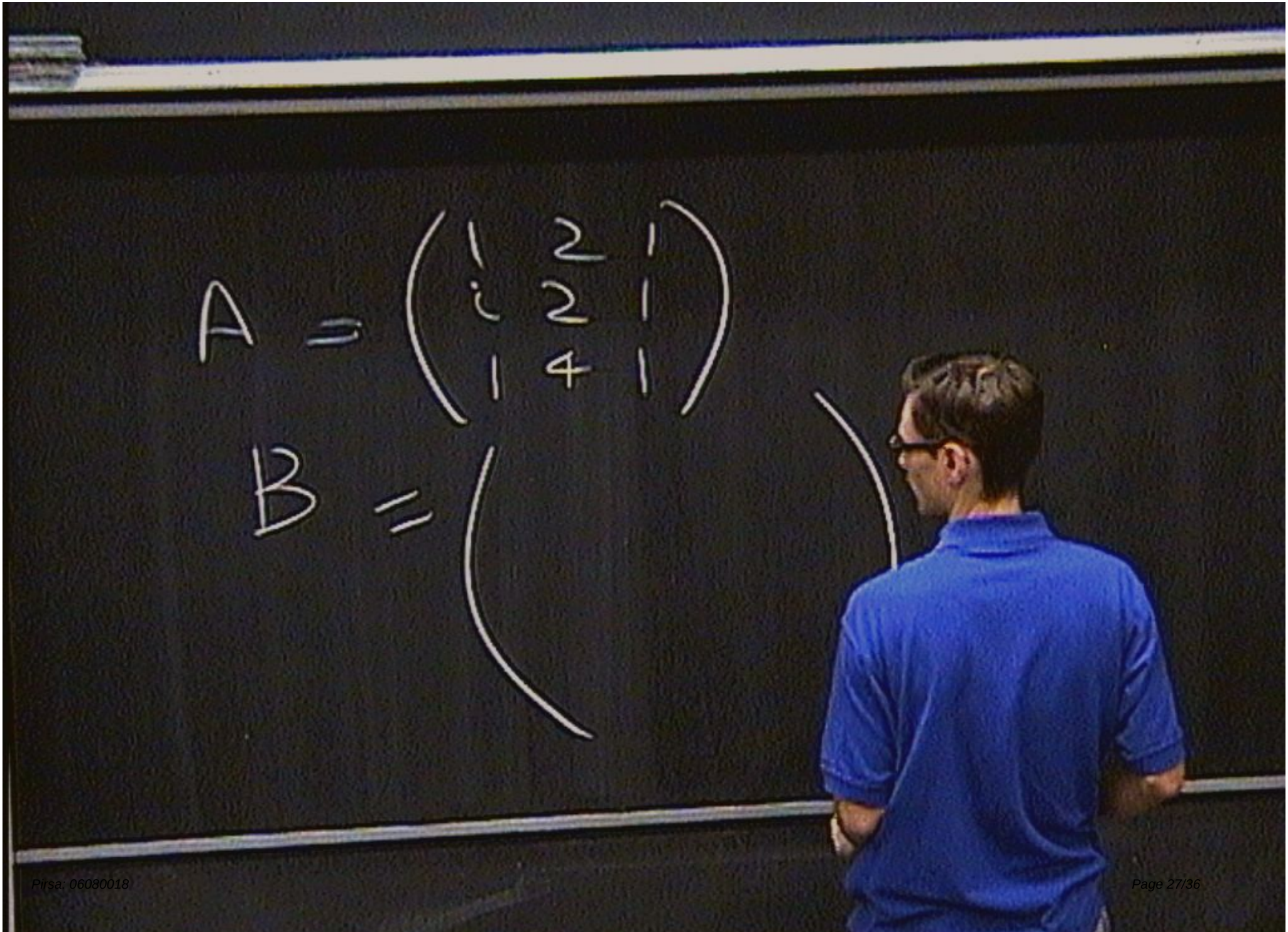
$$B = \begin{bmatrix} 3 & 1 & 4 \\ 1 & 2 & 4 \\ ? & & 5 \end{bmatrix}$$

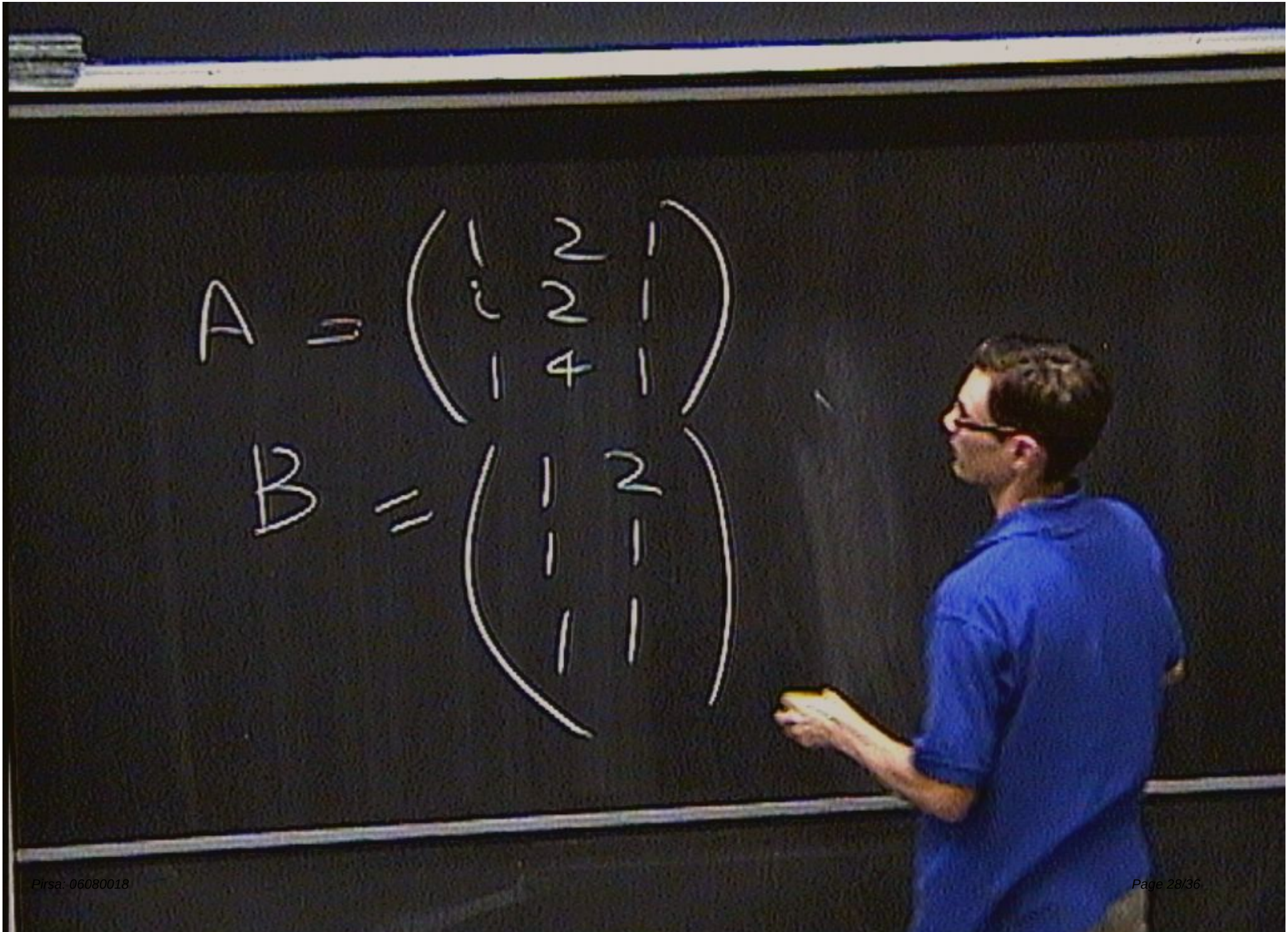
AB

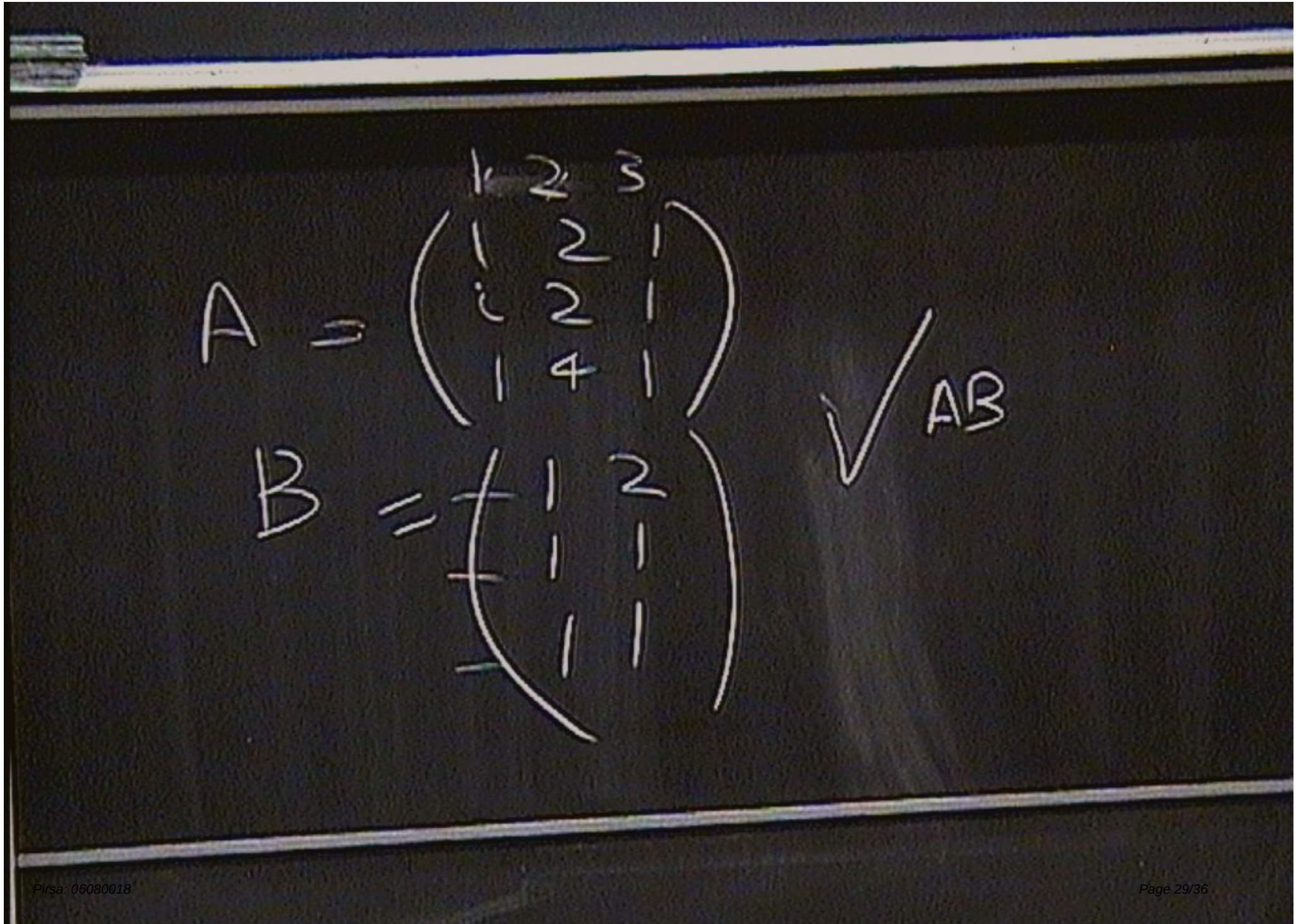
$$AB = \begin{matrix} & 1 & 2 \\ 1 & ae+bg & af+b \\ 2 & ce+dg & cf+dh \end{matrix}$$

COW

f(x)


A = (1 2 1 / i 2 1 / 1 4 1)
B = (


A = (1 2 1 / i 2 1 / 1 4 1)
B = (1 2 / 1 1 / 1 1)


1 2 3
A = 1 2 1
2 2 1
1 4 1
B = 1 2
1 1
1 1
√ AB

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$$

$$B = \begin{pmatrix} 1 & 2 \\ 1 & 0 \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$$

$$B = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$$

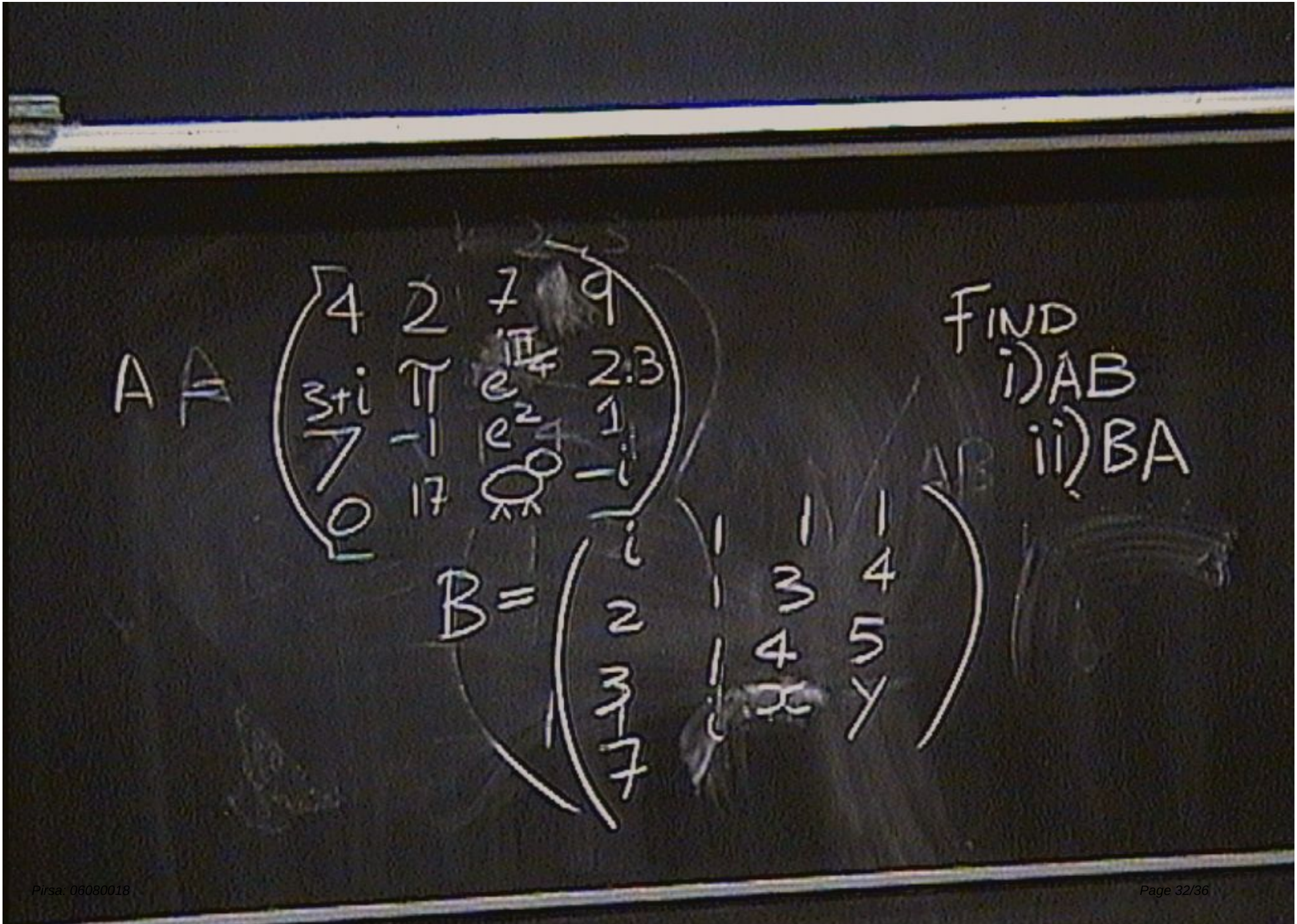
What are

i) A+B

ii) AB

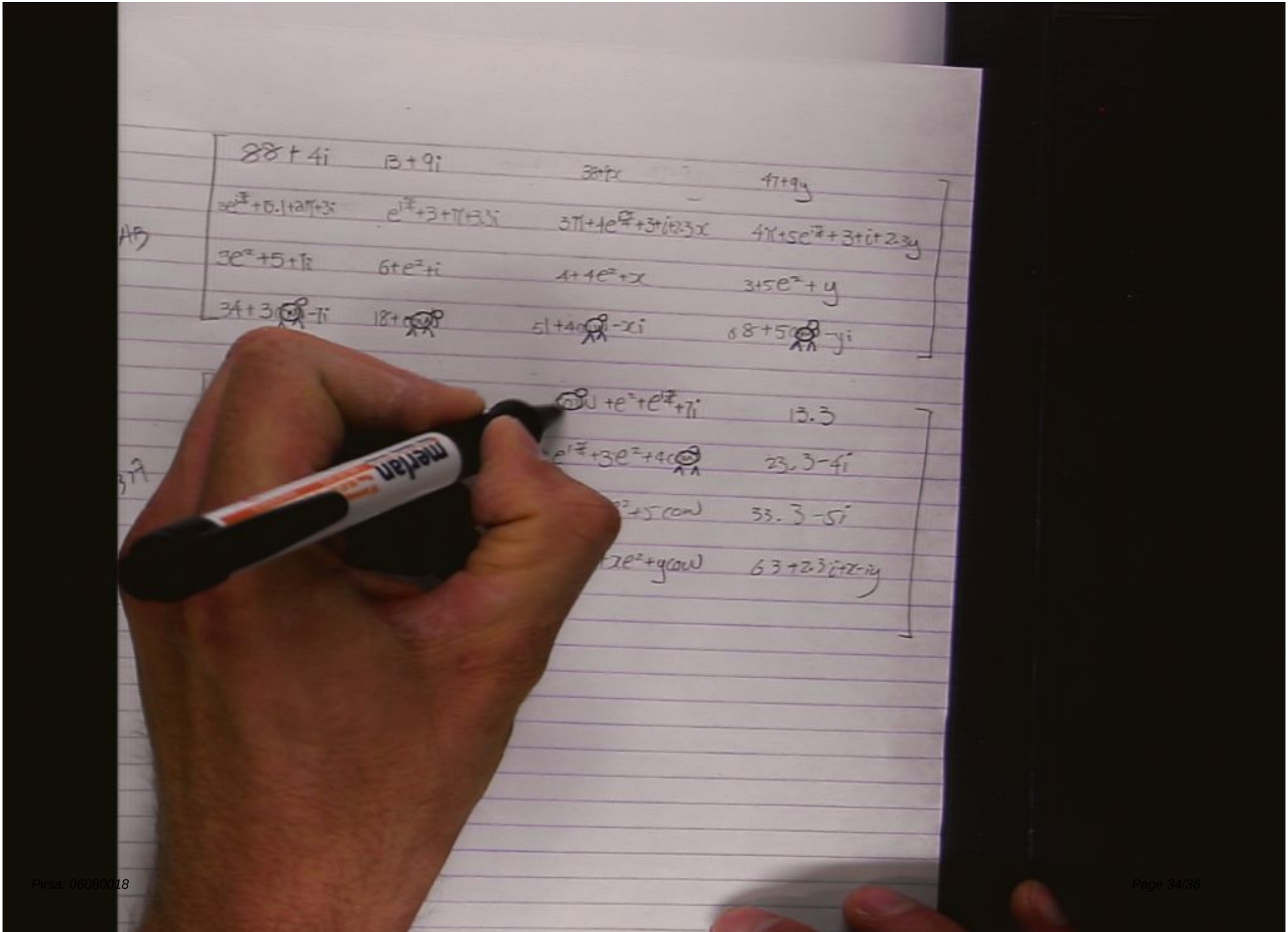
iii) BA

Does AB = BA


A =
4 2 7 9
3+i π $e^{\frac{i\pi}{4}}$ 2.3
7 -1 e^2 1
0 17 $\frac{1}{i}$ -i
B =
i 1 1
2 3 4
3 4 5
7 i x y
FIND
i) AB
ii) BA

$$\begin{bmatrix} 88+4i & 13+9i & 3\pi i x & 47+9y \\ 3e^{\frac{17}{7}}+0.1+2\pi+3i & e^{i\frac{17}{7}}+3+\pi+3.5i & 3\pi+4e^{\frac{17}{7}}+3+i+2.3x & 4x+5e^{i\frac{17}{7}}+3+i+2.3y \\ 3e^{2}+5+7i & 6+e^{2}+i & 4+4e^{2}+x & 3+5e^{2}+y \\ 34+3\cos w-7i & 18+\cos w & 51+4\cos w-xi & 68+5\cos w-yi \end{bmatrix}$$

$$\begin{bmatrix} 10+4i & 16+2i+\pi & \cos w+e^{2}+e^{i\frac{17}{7}}+7i & 13.3 \\ 32+i & 69+\pi & 14+e^{i\frac{17}{7}}+3e^{2}+4\cos w & 23.3-4i \\ 43+i & 87+\pi & 21+e^{i\frac{17}{7}}+4e^{2}+5\cos w & 33.3-5i \\ 21+3i+7x & 14+\pi i+t-x+11y & 49+ie^{i\frac{17}{7}}+7e^{2}+y\cos w & 63+2.3i+x-iy \end{bmatrix}$$


88+4i
13+9i
47+9y
3e^7+0.1+2π+3i
e^7+3+π+3.5i
3π+1e^7+3+i+2.3x
4π+5e^7+3+i+2.3y
3e^2+5+7i
6+e^2+i
4+1e^2+x
3+5e^2+y
18+
-xi
-yi
+e^2+e^7+7i
13.3
e^7+3e^2+4
23.3-4i
+5(cow)
33.3-5i
+ye^2+y(cow)
6.3+2.3i+x-iy
Mean

$$\begin{bmatrix} 88+4i & 13+9i & 38+x & 47+9y \\ 2e^{\frac{17}{7}}+0.1+2\pi+3i & e^{\frac{17}{7}}+3+\pi+3.5i & 3\pi+1e^{\frac{17}{7}}+3+i+2.3x & 4\pi+5e^{\frac{17}{7}}+3+i+2.3y \\ 3e^{2}+5+7i & 6+e^{2}+i & 4+1e^{2}+x & 3+5e^{2}+y \\ 34+3(\quad)-7i & 18+(\quad) & 51+4(\quad)-xi & 68+5(\quad)-yi \end{bmatrix}$$

$$\begin{bmatrix} 10+4i & 16+2i+\pi & (\quad)+e^{2}+e^{\frac{17}{7}}+7i & 13.3 \\ 32+i & 69+\pi & 14+e^{\frac{17}{7}}+3e^{2}+4(\quad) & 23.3-4i \\ 43+i & 87+\pi & 31+e^{\frac{17}{7}}+4e^{2}+5(\quad) & 33.3-5i \\ 21+3i+7x & 14+\pi i+x+11y & 49+ie^{\frac{17}{7}}+7e^{2}+y(\quad) & 63+2.3i+x-iy \end{bmatrix}$$

$$B = \begin{bmatrix} 88+4i & 13+9i & 38+\pi x & 47+9y \\ 3e^{\frac{\pi}{4}}+6.1+a\pi+3i & e^{i\pi}+3+\pi(+3.5i & 3\pi+4e^{\frac{\pi}{4}}+3i(+2.3x & 4\pi+5e^{i\pi}+3+i(+2.3y \\ 3e^{2}+5+7i & 6+e^{2}+i & 4+4e^{2}+x & 3+5e^{2}+y \\ 34+3(\text{illegible})-7i & 18+(\text{illegible}) & 51+40(\text{illegible})-xi & 68+5(\text{illegible})-yi \end{bmatrix}$$

$$A = \begin{bmatrix} 10+4i & 16+2i+\pi & (\text{illegible})+e^{2}+e^{i\pi}+7i & 13.3 \\ 32+i & 9(+\pi & 14+e^{i\pi}+3e^{2}+4(\text{illegible}) & 23.3-4i \\ 43+i & 87+\pi & 41+e^{i\pi}+4e^{2}+5(\text{illegible}) & 33.3-5i \\ 27+3i+7x & 14+\pi i t-x+17y & 49+ie^{i\pi}+7e^{2}+y(\text{illegible}) & 63+23i+7-iy \end{bmatrix}$$