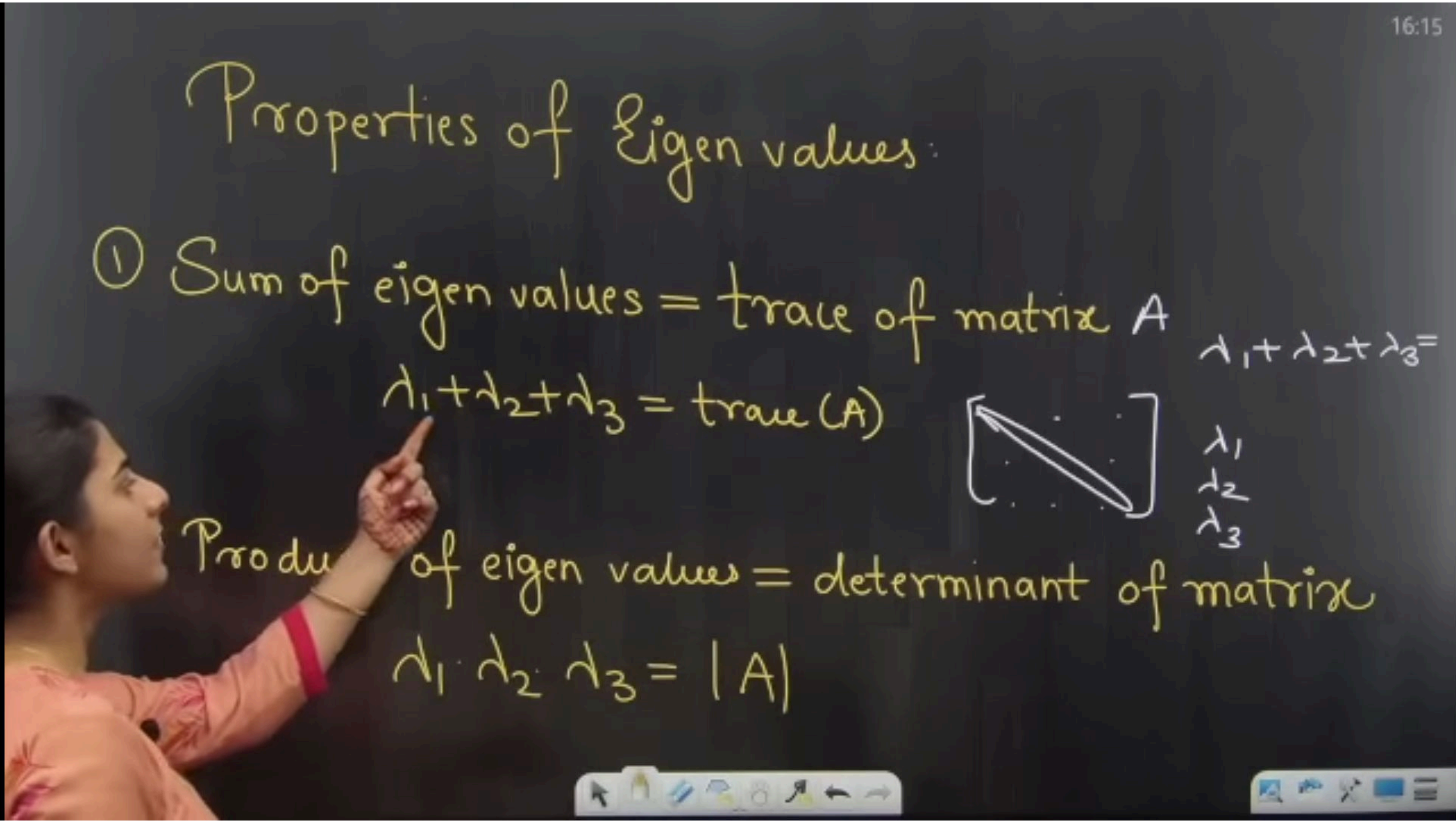

16:15
Properties of Eigen values:
① Sum of eigen values = trace of matrix A
$\lambda_1+\lambda_2+\lambda_3$ = trace (A)
$\lambda_1+\lambda_2+\lambda_3=$
λ_1
λ_2
λ_3
Produ of eigen values = determinant of matrix
$\lambda_1 \cdot \lambda_2 \cdot \lambda_3 = |A|$

16:15

Properties of Eigen values:

① Sum of eigen values = trace of matrix A

$$\lambda_1 + \lambda_2 + \lambda_3 = \text{trace}(A)$$

$\lambda_1 + \lambda_2 + \lambda_3 =$

λ_1

λ_2

λ_3

Product of eigen values = determinant of matrix

$$\lambda_1 \cdot \lambda_2 \cdot \lambda_3 = |A| \qquad \lambda_1 \cdot \lambda_2 \cdot \lambda_3 = |A|$$

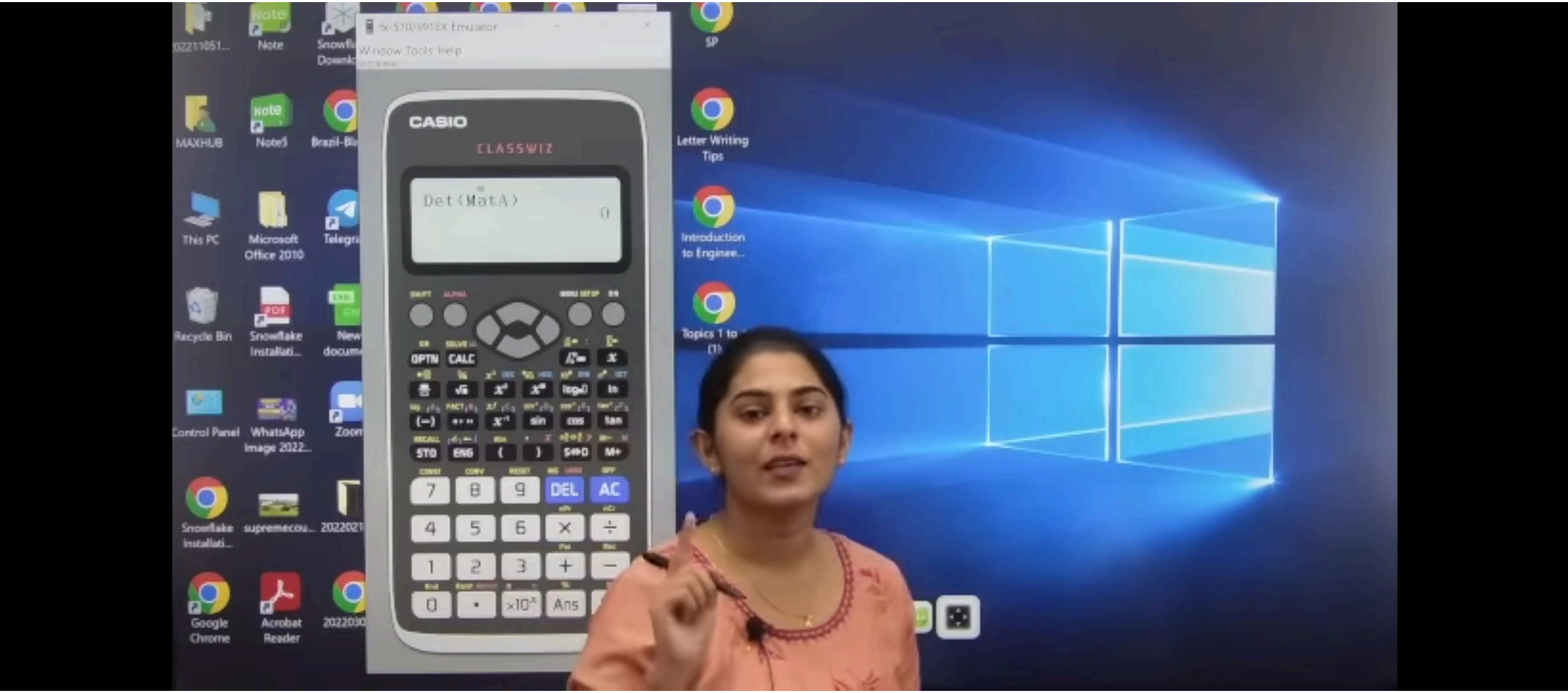
16:18

Find the sum & product of the eigen values of matrix $A=\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

t $\lambda_1, \lambda_2, \lambda_3$ be the eigen values of A

$$\lambda_1+\lambda_2+\lambda_3 = \text{trace of } A$$

$$\lambda_1+\lambda_2+\lambda_3 = 8+7+3$$


CASIO
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Control Panel
WhatsApp Image 2022...
Zoom
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Pro $\rightarrow$ $\lambda_1 + \lambda_2 + \lambda_3 = \text{trace of } A$

$$\lambda_1 + \lambda_2 + \lambda_3 = 8 + 7 + 3$$

$$\underline{\lambda_1 + \lambda_2 + \lambda_3 = 18}$$

Pro $\Rightarrow$ $\lambda_1 \cdot \lambda_2 \cdot \lambda_3 = |A|$

$$\lambda_1 \cdot \lambda_2 \cdot \lambda_3 = 0$$

16:23

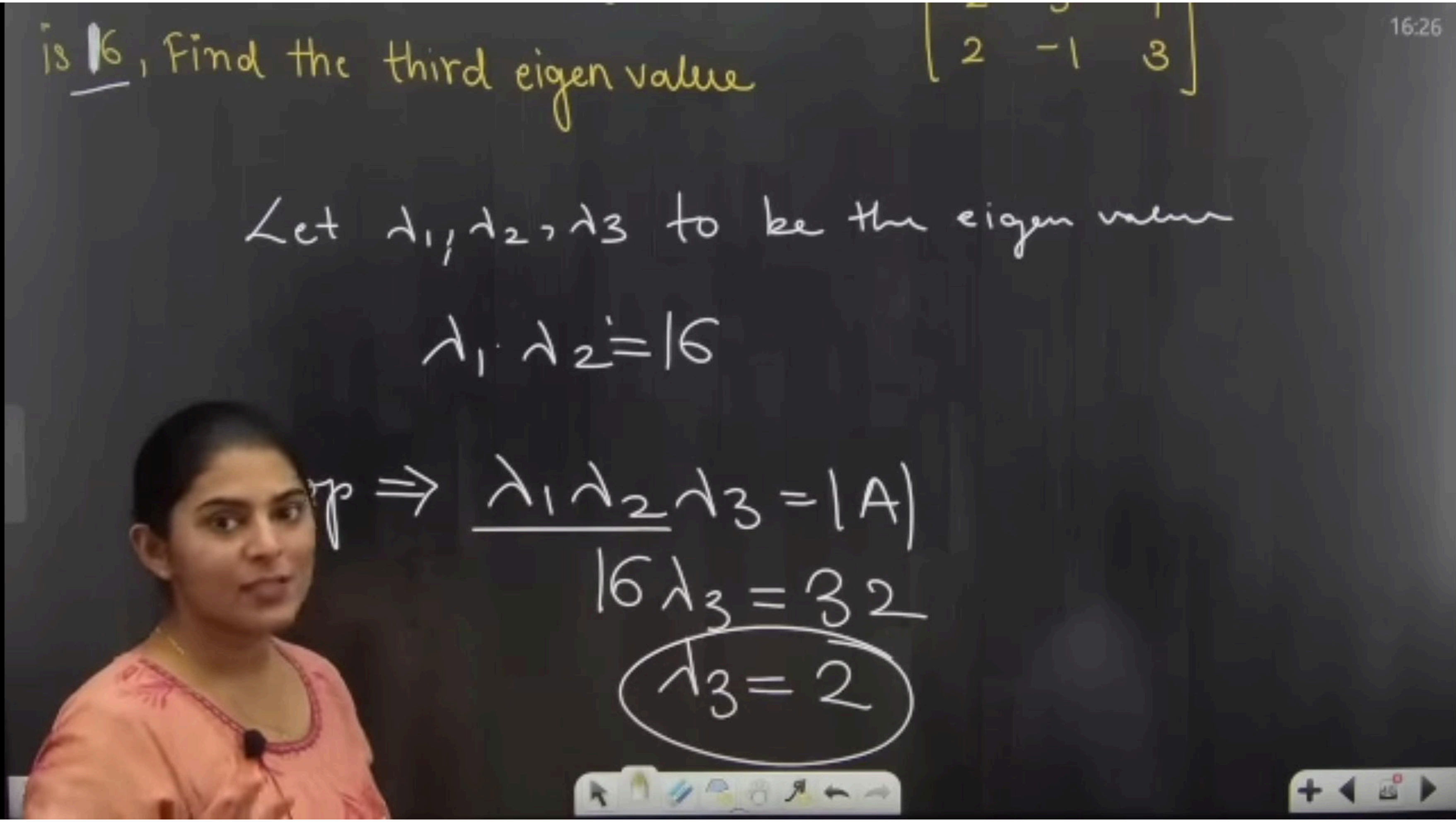
16:24

If the product of 2 eigen values of $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ is 6, Find the third eigen value

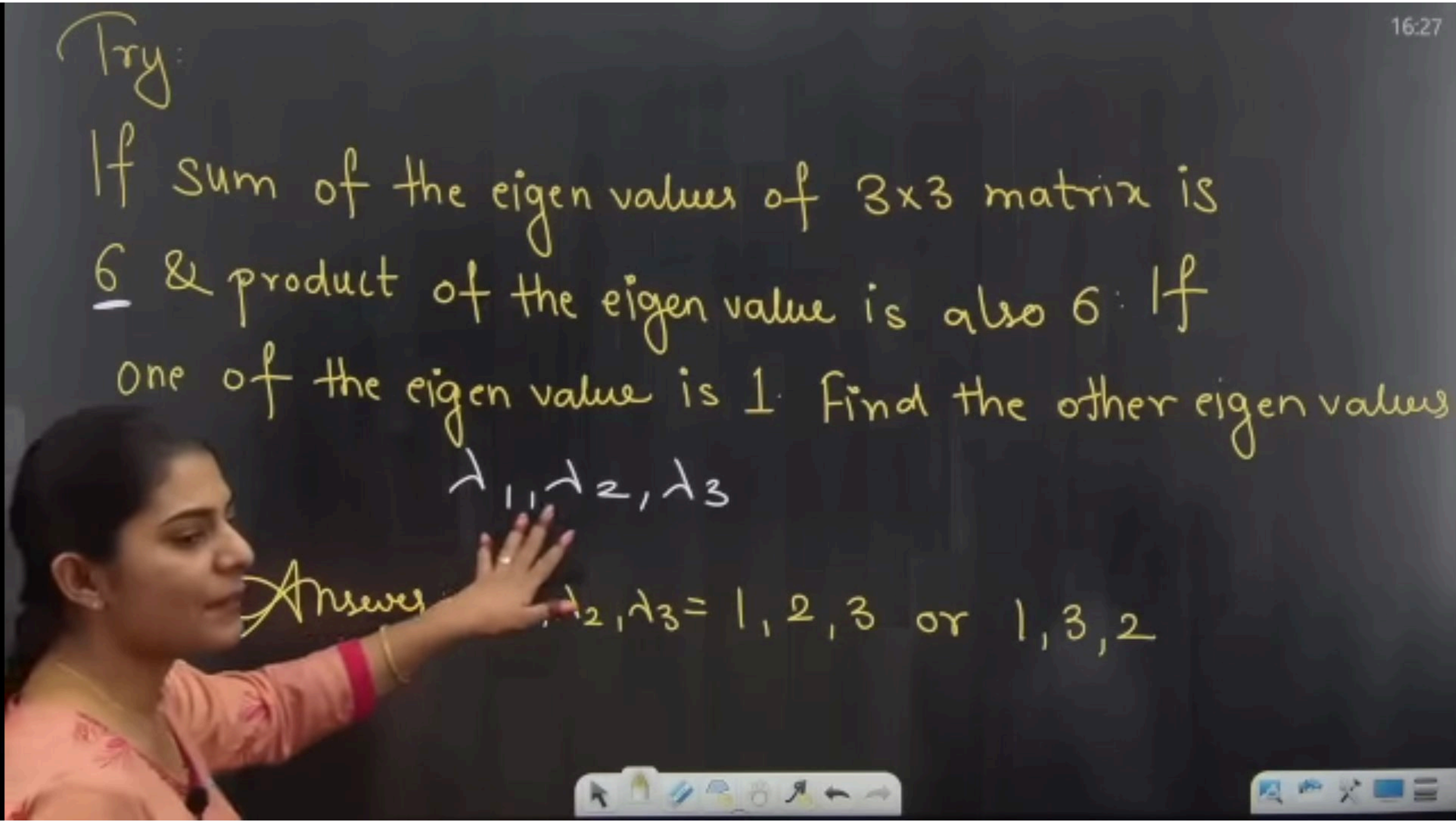
Let $\lambda_1, \lambda_2, \lambda_3$ to be the eigen values

$$\lambda_1 \cdot \lambda_2 = 6$$

Pr



is 16, Find the third eigen value
2 -1 3
16:26
Let $\lambda_1, \lambda_2, \lambda_3$ to be the eigen value
$\lambda_1 \cdot \lambda_2 = 16$
p ⇒ $\lambda_1 \lambda_2 \lambda_3 = |A|$
$16 \lambda_3 = 32$
$\lambda_3 = 2$


16:27
Try:
If sum of the eigen values of 3x3 matrix is
6 & product of the eigen value is also 6. If
one of the eigen value is 1. Find the other eigen values
λ1, λ2, λ3
Answer
λ2, λ3 = 1, 2, 3 or 1, 3, 2

16:28

Try:

If sum of the eigen values of 3x3 matrix is 6 & product of the eigen value is also 6. If one of the eigen value is 1. Find the other eigen values

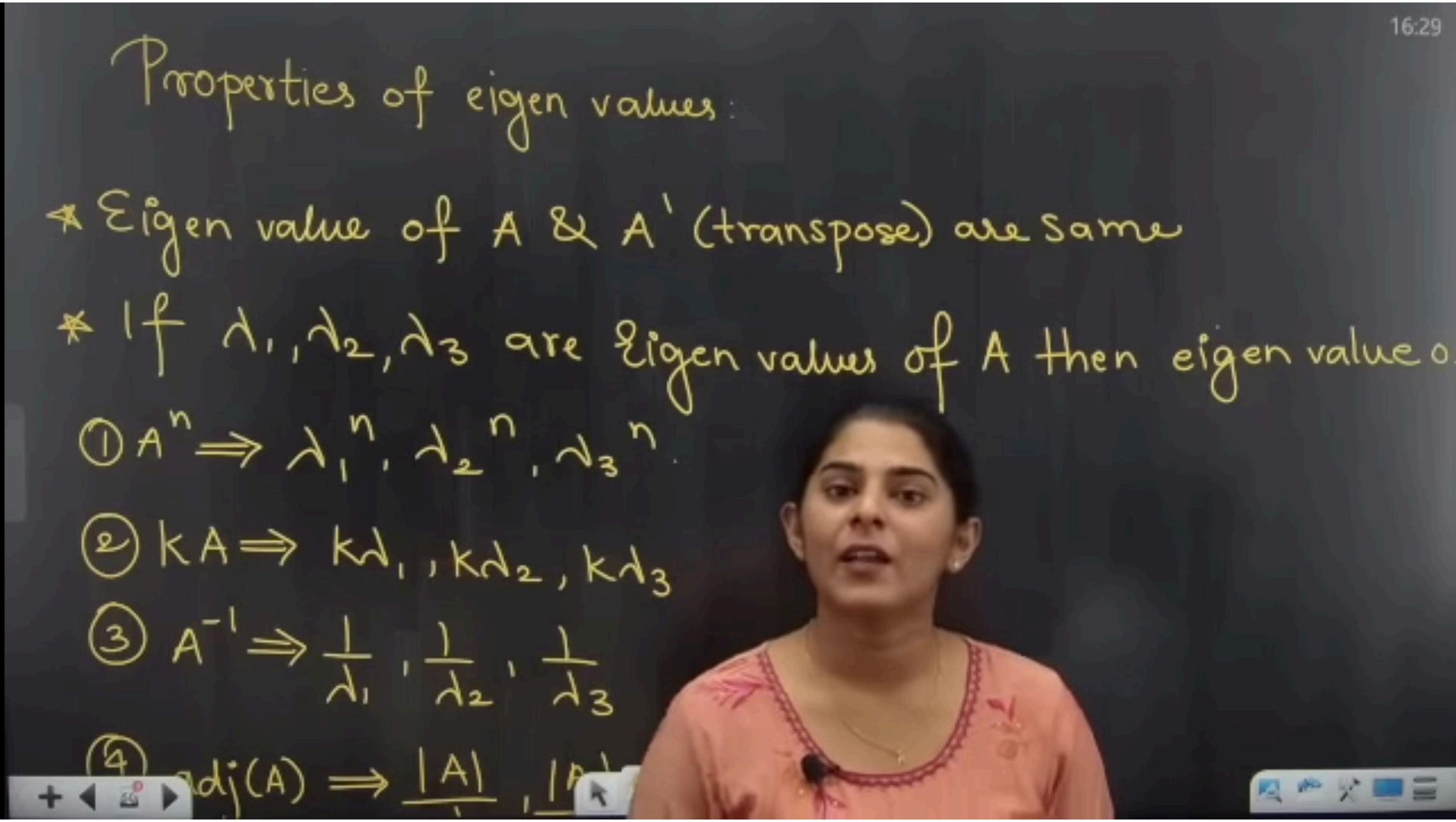
$\lambda \ldots \lambda_3$ $\qquad \underline{\lambda_1\lambda_2\lambda_3 = 6}$ $\qquad \lambda_2\lambda_3 = 6$

$\lambda_1 + \lambda_2 + \lambda_3 = 6$ $\qquad \lambda_2 = 6/\lambda_3$

$\lambda_3 = 6/\lambda_2$

Answer: $\ldots\lambda_3 = 1, 2, 3$ or $1, 3, 2$

$1 + \lambda_2 + \lambda_3 = 6$


16:29
Properties of eigen values:
* Eigen value of A & A' (transpose) are same
* If $\lambda_1, \lambda_2, \lambda_3$ are Eigen values of A then eigen value o
① $A^n \Rightarrow \lambda_1^n, \lambda_2^n, \lambda_3^n$
② $KA \Rightarrow K\lambda_1, K\lambda_2, K\lambda_3$
③ $A^{-1} \Rightarrow \frac{1}{\lambda_1}, \frac{1}{\lambda_2}, \frac{1}{\lambda_3}$
④ $adj(A) \Rightarrow |A|$

16:32

* If $\lambda_1, \lambda_2, \lambda_3$ are Eigen values of A then eigen value

① $A^n \Rightarrow \lambda_1^n, \lambda_2^n, \lambda_3^n$.

② $kA \Rightarrow k\lambda_1, k\lambda_2, k\lambda_3$

③ $A^{-1} \Rightarrow \frac{1}{\lambda_1}, \frac{1}{\lambda_2}, \frac{1}{\lambda_3}$

④ $\text{adj}(A) \Rightarrow \frac{|A|}{\lambda_1}, \frac{|A|}{\lambda_2}, \frac{|A|}{\lambda_3}$

A	1	2	3
A^{-1}	$1/1$,	$1/2$,	$1/3$

Eigen value of identity matrix is 1, 1, 1.

16:33

(4) $\text{adj}(A) \Longrightarrow \frac{|A|}{\lambda_1}, \frac{|A|}{\lambda_2}, \frac{|A|}{\lambda_3}$

* Eigen value of identity matrix is 1, 1, 1.

* Eigen value of upper/Lower triangular matrix are diagonal ele[illegible]t.

If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ find eigen values of $A^3 + 5A + 8I$

Let $\lambda_1, \lambda_2, \lambda_3$

$\lambda_1 = -1$

$\lambda_2 = 3$

$\lambda_3 = -2$

16:38

$\lambda_1 = -1$

$\lambda_2 = 3$

$\lambda_3 = -2$

A^n

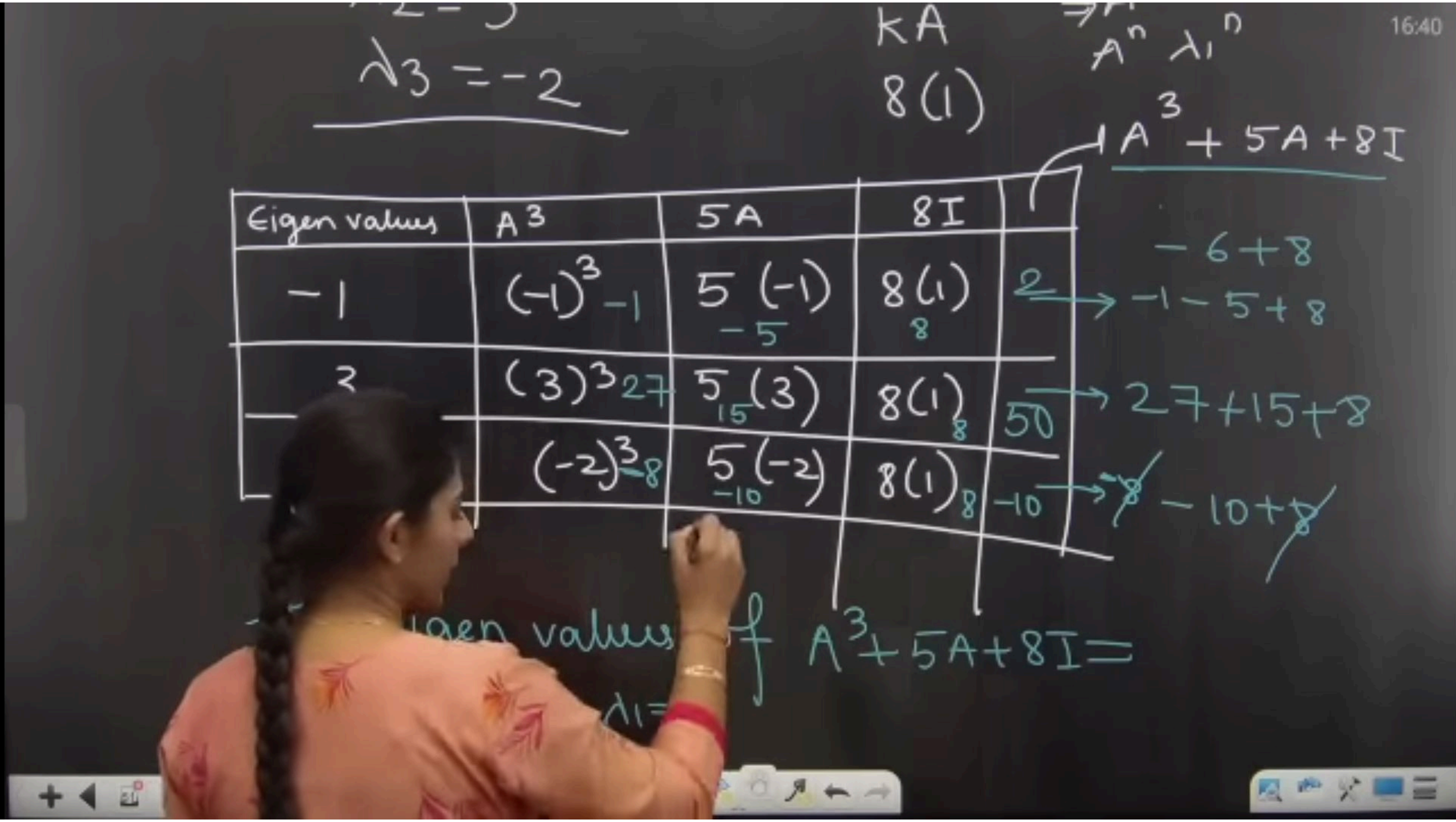
$kA \Rightarrow A$

$8(1)$

$A^n \lambda_1^n$

$1A^3 + 5A + 8I$

Eigen values	A^3	$5A$	$8I$	
-1	$(-1)^3$	$5(-1)$	$8(1)$	
3	$(3)^3$	$5(3)$	$8(1)$	
-2	$(-2)^3$	$5(-2)$	$8(1)$	


λ3 = -2
kA
8(1)
A^n λ1^n
A^3 + 5A + 8I
Eigen values | A^3 | 5A | 8I
-1 | (-1)^3 -1 | 5(-1) -5 | 8(1) 8 | 2
3 | (3)^3 27 | 5(3) 15 | 8(1) 8 | 50
(-2)^3 -8 | 5(-2) -10 | 8(1) 8 | -10
-6+8
-1-5+8
27+15+8
-8 -10+8
values of A^3+5A+8I =
λ1 =
16:40

16:41

3	$(3)^3$ 27	$5(3)$ 15	$8(1)$ 8	50
-2	$(-2)^3$ -8	$5(-2)$ -10	$8(1)$ 8	-10

$\rightarrow 27+15+8$

$\rightarrow \cancel{-8}-10+\cancel{8}$

The eigen values of $A^3+5A+8I=$

$\lambda_1' = 2$

$\lambda_2' = 50$

$\lambda_3' = -10$

16:41

Try:

If $A = \begin{bmatrix} 1 & 0 \\ 2 & 4 \end{bmatrix}$. then find the eigen values of

$$4A^{-1} + 3A + 2I$$

Answer: 9 & 15.