INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA DE SÃO PAULO – CAMPUS CUBATÃO

Discente: Stephany da Costa Silva

Docente: Luciano Reis

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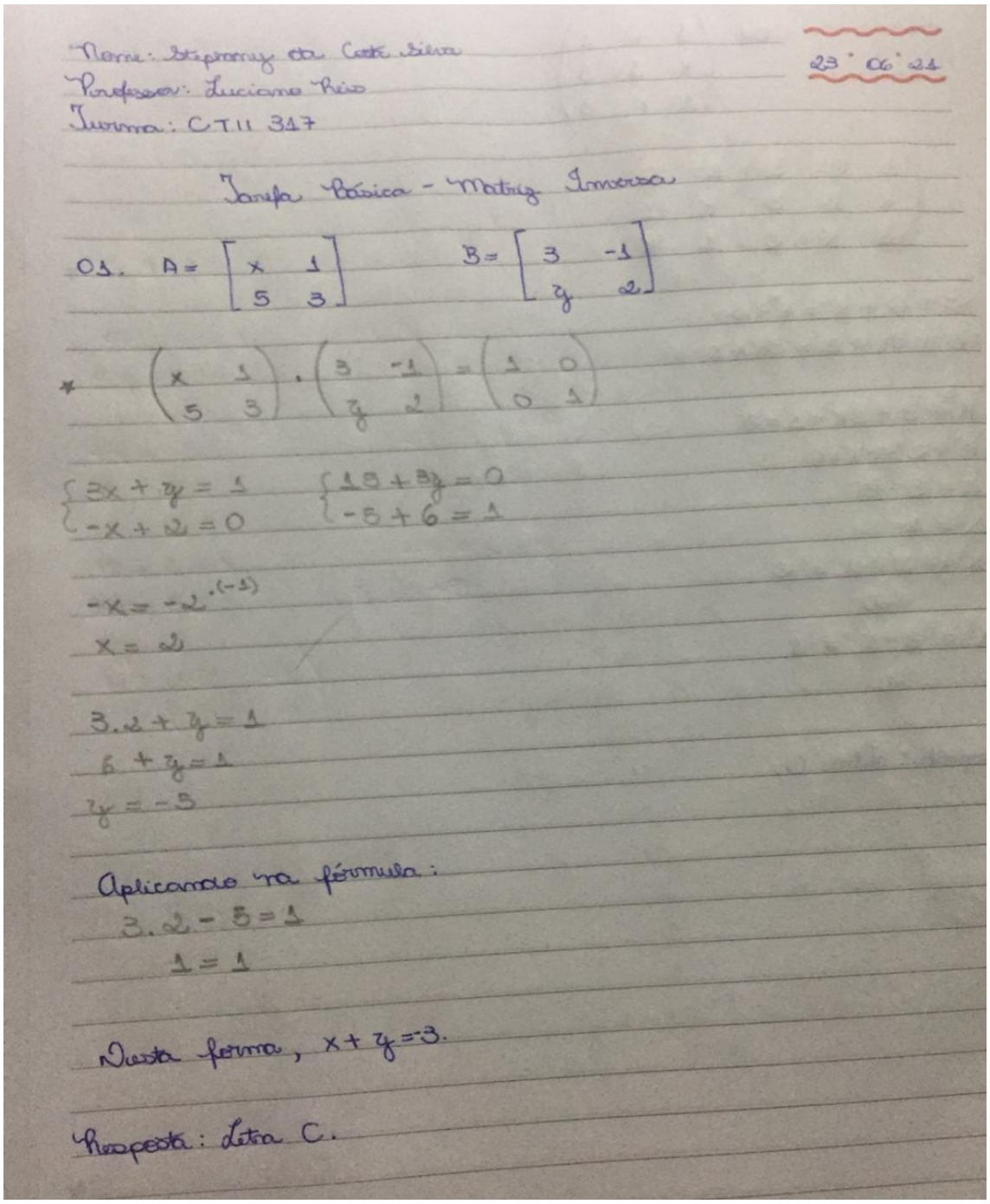
Turma: CTII 317

MATRIZ INVERSA

QUESTÕES

01.



Nome: Stéphanny da Costa Silva
Professor: Luciano Reis
Turma: CTII 317

23/06/21

Tarefa Básica - Matriz Inversa

01. $A = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix}$

$$\begin{pmatrix} x & 1 \\ 5 & 3 \end{pmatrix} \cdot \begin{pmatrix} 3 & -1 \\ y & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

$\begin{cases} 3x + y = 1 \\ -x + 2 = 0 \end{cases}$ $\begin{cases} 15 + 3y = 0 \\ -5 + 6 = 1 \end{cases}$

$-x = -2 \cdot (-1)$

$x = 2$

$3 \cdot 2 + y = 1$

$6 + y = 1$

$y = -5$

Aplicando na fórmula:

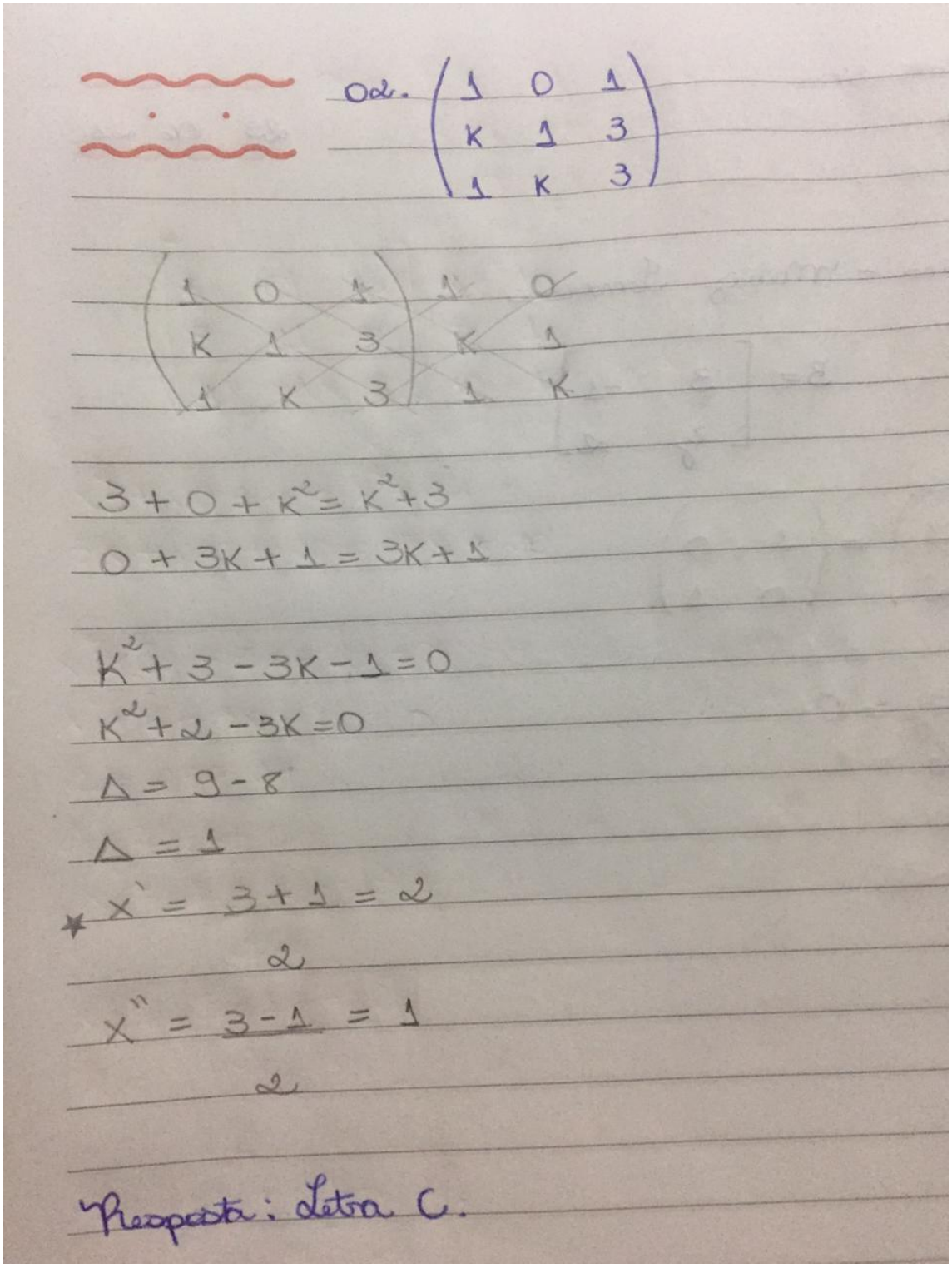
$3 \cdot 2 - 5 = 1$

$1 = 1$

Desta forma, $x + y = -3$.

Resposta: Letra C.

02.


Od.
1 0 1
K 1 3
1 K 3
3 + 0 + K² = K² + 3
0 + 3K + 1 = 3K + 1
K² + 3 - 3K - 1 = 0
K² + 2 - 3K = 0
Δ = 9 - 8
Δ = 1
x' = 3 + 1 = 2
2
x'' = 3 - 1 = 1
2
Resposta: Letra C.

03.

03. $A=\begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$ $B = A^{-1}$

$B=\begin{bmatrix} x & y \\ a & v \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix} \cdot \begin{bmatrix} x & y \\ a & v \end{bmatrix}$

$* \begin{cases} 3x + 5a = 1 \\ 2x + 4a = 0 \end{cases}$ $\begin{cases} 3y + 5v = 0 \\ 2y + 4v = 1 \end{cases}$

$-a = 1$

$a = -1$

$3x + 5.(-1) = 1$

$3x - 5 = 1$

$3x = 6$

$x = 2$

$-v = -3$

$v = \frac{3}{2}$

$3y + 5.\left(\frac{3}{2}\right) = 0$

$3y + \frac{15}{2} = 0$

$3y = -\frac{15}{2}$

$y = \frac{-\frac{15}{2}}{3}$

$\frac{15}{2}$

$\frac{3}{1}$

$y = -\frac{15}{6} \overset{:3}{=} -\frac{5}{2}$

$B = \begin{bmatrix} 2 & -5/2 \\ -1 & 3/2 \end{bmatrix}$

Resposta: Letra C.

04.

04. $\begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix}$

$\begin{vmatrix} x & 1 & 2 & x & 1 \\ 3 & 1 & 2 & 3 & 1 \\ 10 & 1 & x & 10 & 1 \end{vmatrix}$

$x^2 + 20 + 6 = x^2 + 26$

$3x + 2x + 20 = 5x + 20$

$x^2 + 26 - 5x - 20 = 0$

$x^2 + 6 - 5x = 0$

$\Delta = 25 - 24$

$\Delta = 1$

$x' = \frac{5 + 1}{2} = 3$

$x'' = \frac{5 - 1}{2} = 2$

Resposta: Letra A.

05.

05. $\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix}$

$\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} \begin{matrix} -1 & -1 \\ 2 & 1 \\ 1 & 1 \end{matrix}$

$1 + 2 + 4 = 7$

$* \; 2 + 2 + 2 = 6$

$7 - 6 = 1$

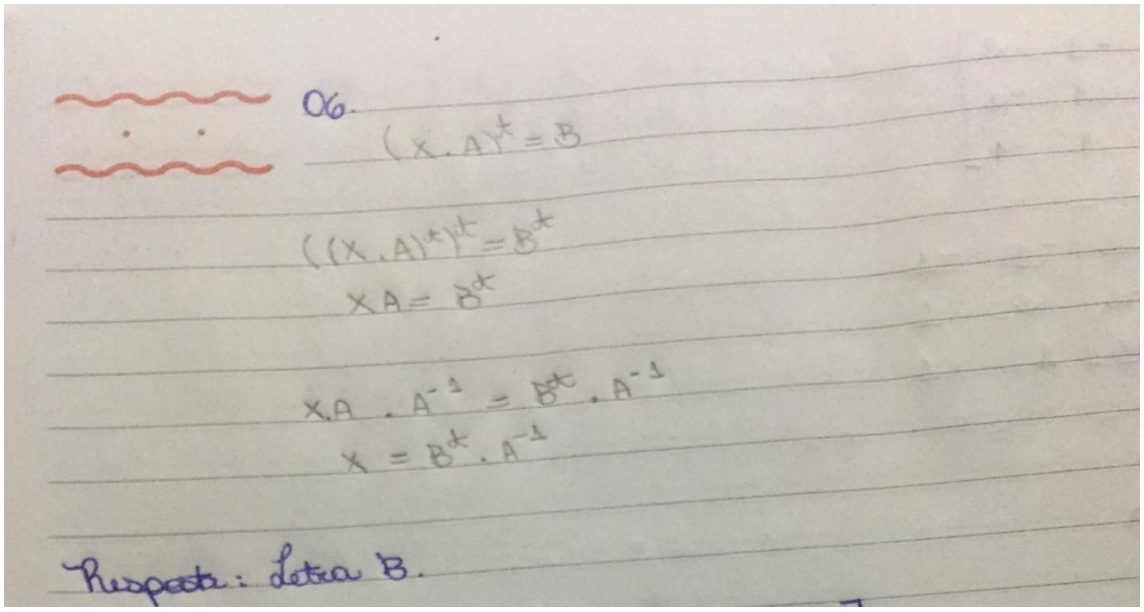
$A = \begin{bmatrix} 1 & 0 & 1 \\ 1 & -1 & 0 \\ 0 & 2 & 1 \end{bmatrix}$ $\quad A^t = \begin{bmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{bmatrix}$

Soma de matrizes

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

Resposta: Letra B.

06.



06.

$(X \cdot A)^t = B$

$((X \cdot A)^t)^t = B^t$

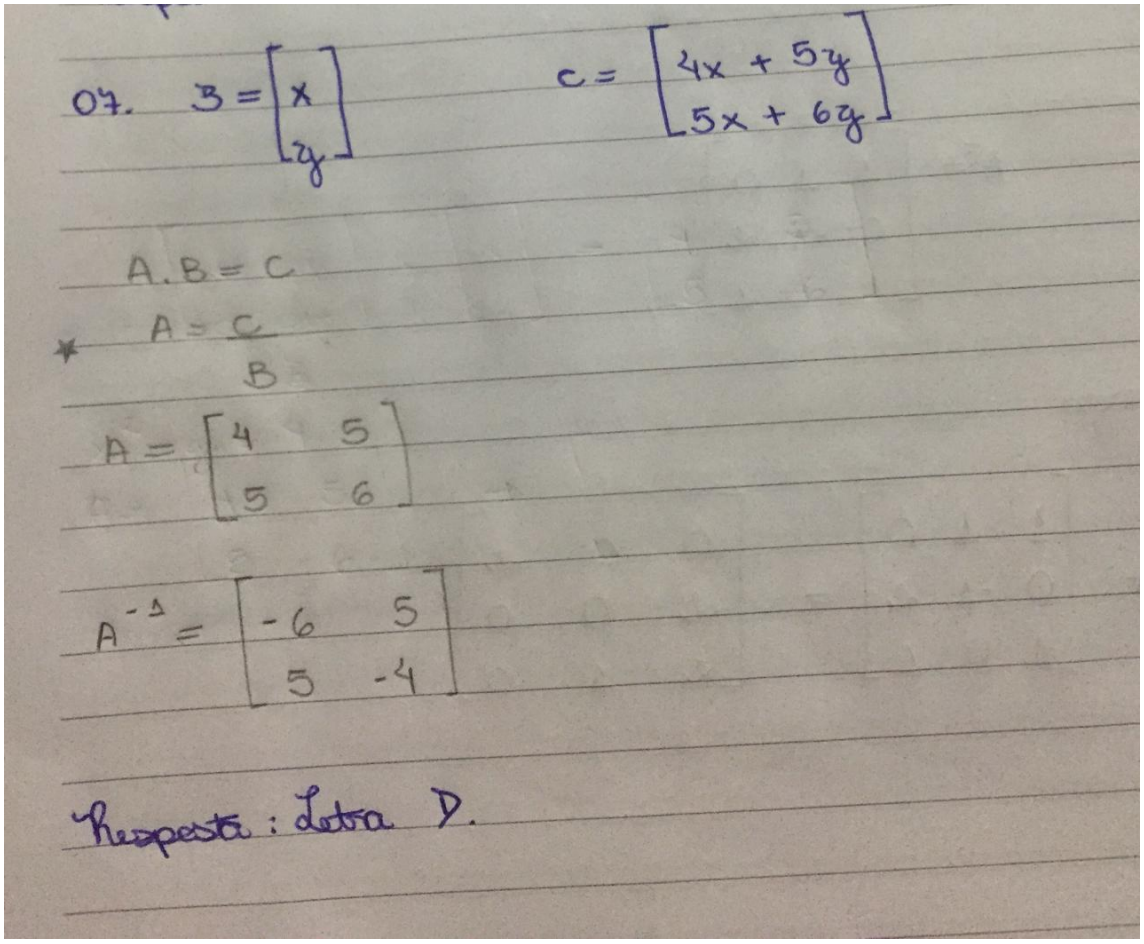
$XA = B^t$

$XA \cdot A^{-1} = B^t \cdot A^{-1}$

$X = B^t \cdot A^{-1}$

Resposta: Letra B.

07.



07. $B = \begin{bmatrix} x \\ y \end{bmatrix}$ $\quad C = \begin{bmatrix} 4x + 5y \\ 5x + 6y \end{bmatrix}$

$A \cdot B = C$

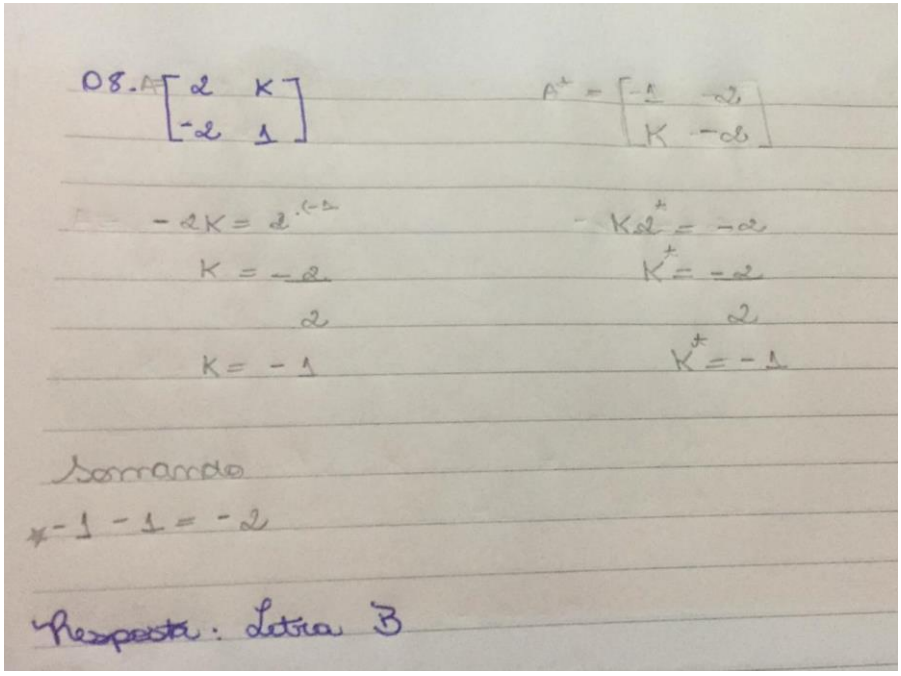
$A = \frac{C}{B}$

$A = \begin{bmatrix} 4 & 5 \\ 5 & 6 \end{bmatrix}$

$A^{-1} = \begin{bmatrix} -6 & 5 \\ 5 & -4 \end{bmatrix}$

Resposta: Letra D.

08.



08. $A = \begin{bmatrix} 2 & K \\ -2 & 1 \end{bmatrix}$ $\quad A^t = \begin{bmatrix} 2 & -2 \\ K & 1 \end{bmatrix}$

$-2K = 2 \cdot (-2)$ $\quad -K2^t = -2$

$K = \frac{-2}{2}$ $\quad K^t = \frac{-2}{2}$

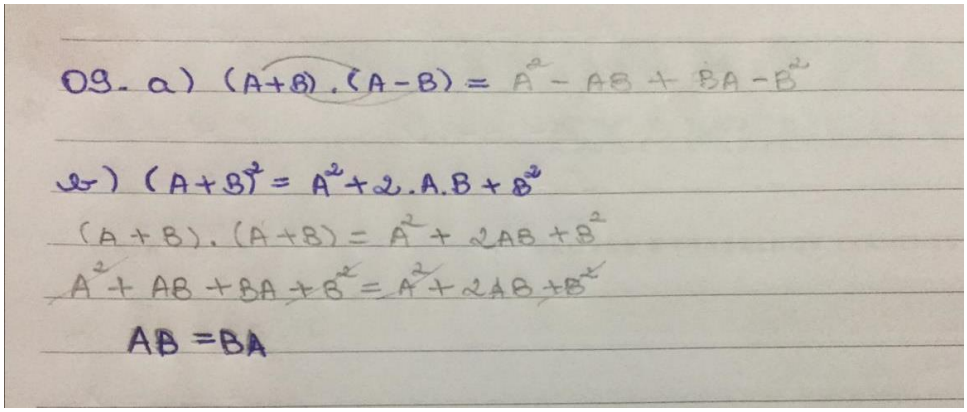
$K = -1$ $\quad K^t = -1$

Somando

$-1 - 1 = -2$

Resposta: Letra B

09.



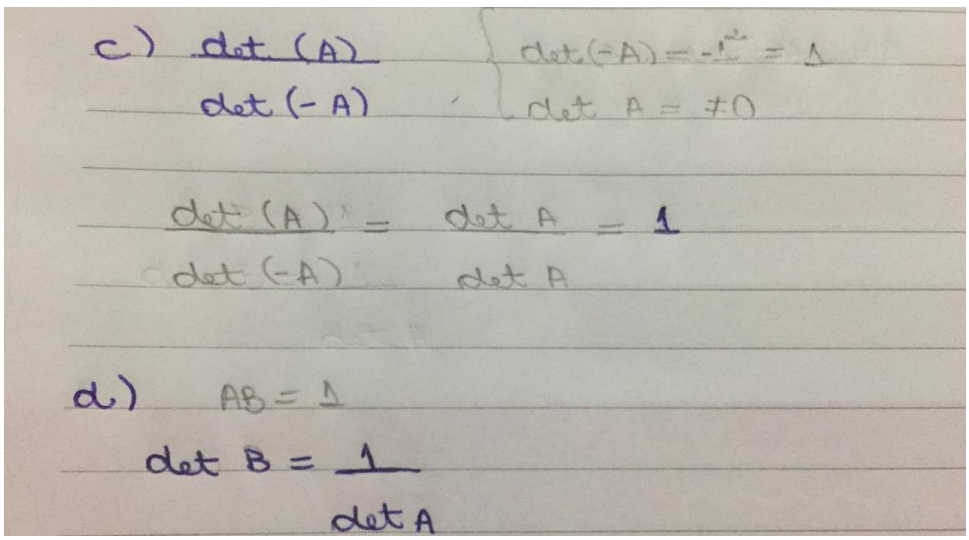
09. a) $(A+B).(A-B) = A^2 - AB + BA - B^2$

b) $(A+B)^2 = A^2 + 2.A.B + B^2$

$(A+B).(A+B) = A^2 + 2AB + B^2$

$A^2 + AB + BA + B^2 = A^2 + 2AB + B^2$

$AB = BA$



c) $\frac{\det(A)}{\det(-A)}$ $\quad \det(-A) = -1^2 = 1$ $\quad \det A \neq 0$

$\frac{\det(A)}{\det(-A)} = \frac{\det A}{\det A} = 1$

d) $AB = 1$

$\det B = \frac{1}{\det A}$