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01 a) $\begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} = |10 - 3| = 7$

b) $\begin{vmatrix} -2 & -4 \\ 3 & 6 \end{vmatrix} = (-2)\cdot 6 - 3\cdot(-4) = -12 - (-12) = -12 + 12 = 0$

c) $\begin{vmatrix} 3 & -1 & 1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{vmatrix}$

$1 + (-12) + 4 = -7$

$3 - (-7) = 3 + 7 = 10$

$-6 + 1 + 8 = 3$

d) $\begin{vmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{vmatrix}$

$-3 + 3 + 16 = 16$

$36 + 2 + (-2) = 36$

$= 36 - 16 = 20$

02 se $i = j \therefore a_{ij} = -3 = a_{11} = a_{22} = a_{33}$

se $i \neq j \therefore a_{ij} = 0$

$$\begin{vmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{vmatrix} = -27$$

$0\ 0\ 0$

$-27\ 0\ 0$

03

$$\begin{vmatrix} x & 1 & x \\ 3 & x & 4 \\ 1 & 3 & 3 \end{vmatrix}$$

$x^2 + 12x + 9$

$3x^2 + 4 + 9x$

$3x^2 + 9x + 4$

$\oplus\ -x^2 - 12x - 9$

$2x^2 - 3x - 5 = -3 + 3$

$2x^2 - 3x - 2 = 0$

SÃO DOMINGOS

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D S T Q Q S S

$a = 2$
$b = -3$
$c = -2$

$\Delta = (-3)^2 - 4 \cdot 2 \cdot (-2)$
$\Delta = 9 + 16$
$\Delta = 25$

$x = \frac{-(-3) \pm \sqrt{25}}{2 \cdot 2} = \frac{3 \pm 5}{4}$

$x' = 2$
$x'' = -1/2$

04

$2(x+1)+(x-1)$

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

$(x-1)(x+1)(x+1)+2$

$(x-1)(x+1)(x+1) + 2 - 2(x+1) - (x-1) = 2$
$(x^2-1)(x+1) - 2x - 2 - x + 1 = 0$
$x^3 + x^2 - x - 1 - 2x - x - 1 = 0$
$x^3 + x^2 - 4x - 2 = 0$

A soma das raízes de uma equação cúbica é dada por $\frac{-b}{a}$. Portanto:

$a = 1$
$b = 1$
$c = -4$
$d = -2$

$\frac{-1}{1} = \boxed{-1}$

05

$$A = \begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}$$

$a_{ij} = 2i - 3j$
$a_{11} = 2 \cdot 1 - 3 \cdot 1 = -1$
$a_{12} = 2 \cdot 1 - 3 \cdot 2 = -4$
$a_{21} = 2 \cdot 2 - 3 \cdot 1 = 1$
$a_{22} = 2 \cdot 2 - 3 \cdot 2 = -2$
$a_{31} = 2 \cdot 3 - 3 \cdot 1 = 3$
$a_{32} = 2 \cdot 3 - 3 \cdot 2 = 0$

$b_{jk} = k - j$
$b_{11} = 1 - 1 = 0$
$b_{12} = 2 - 1 = 1$
$b_{13} = 3 - 1 = 2$
$b_{21} = 1 - 2 = -1$
$b_{22} = 2 - 2 = 0$
$b_{23} = 3 - 2 = 1$

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

$A_{3\times2} \cdot B_{2\times3} = AB_{3\times3}$

$$AB = \begin{bmatrix} 0+4 & -1+0 & -2-4 \\ 0+2 & 1+0 & 2-2 \\ 0+0 & 3+0 & 6+0 \end{bmatrix} = \begin{bmatrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{bmatrix}$$

$0+0-12$

$24+0-36$

$|AB| = 24-36-(-12) = -12+12 = \boxed{0}$

06) $A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix}$ $A_{2\times3} \cdot B_{3\times2} = AB_{2\times2}$

$$AB = \begin{bmatrix} 2+0+0 & -2+0-2 \\ -1-1+0 & 1+1+0 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix}$$

8

4

$\boxed{|AB| = 4-8 = -4}$