data fecha 29.04.21

1) 2.5
2) 2.5
3) 1.5
4) 2.5

NOTA = 9.0

Nome: Gabriel Gonçalves de Oliveira
Profª Dra. Marisa Atsuko Nitto - Matemática 1
Primeira Prova

1) (2.5) Escreva em forma de tabela as matrizes dadas:

1.1) $A=(a_{ij})_{3\times4}$ tal que $a_{ij}=(-i^2)-(-j^2)-3/5\,(i.j)$

$$A=\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \end{bmatrix}_{3\times4} ; A=\begin{bmatrix} -3/5 & 9/5 & 31/5 & 63/5 \\ -21/5 & -12/5 & 7/5 & 36/5 \\ -49/5 & -43/5 & -27/5 & -1/5 \end{bmatrix}_{3\times4}$$

$a_{11}=(-1^2)-(-1^2)-3/5\,(1.1)=$
$-1+1-3/5.1=$
$0-3/5=-3/5$

$a_{12}=(-1^2)-(-2^2)-3/5\,(1.2)=$
$-1+4-3/5.2=+3-3/5.2/1=$
$+3-6/5=3/1-6/5=$
$15/5-6/5=+9/5$

$a_{13}=(-1^2)-(-3^2)-3/5\,(1.3)=$
$-1+9-3/5.3=+8-3/5.3/1=$
$+8/1-9/5=+40/5-9/5=$
$+31/5$

$a_{14}=(-1^2)-(-4^2)-3/5\,(1.4)=$
$-1+16-3/5.4=+15-3/5.4/1=$
$+15-12/5=+15/1-12/5=$
$+75/5-12/5=+63/5$

$a_{21}=(-2^2)-(-1^2)-3/5\,(2.1)=$
$-4+1-3/5.2=-3-3/5.2/1=$
$-3/1-6/5=-15/5-6/5=-21/5$

$a_{22}=(-2^2)-(-2^2)-3/5\,(2.2)=$
$-4+4-3/5.4=0-3/5.4/1=$
$-12/5$

$a_{23}=(-2^2)-(-3^2)-3/5\,(2.3)=$
$-4+9-3/5.6=+5-3/5.6/1=$
$+5/1-18/5=+25/5-18/5=$
$+7/5$

$a_{24}=(-2^2)-(-4^2)-3/5\,(2.4)=$
$-4+16-3/5.8=+12-3/5.8/1=$
$+12/1-24/5=+60/5-24/5=$
$+36/5$

data fecha 29.04.21

$a_{31} = (-3^2) - (-1^2) - 3/5(3.1) =$
$-9+1-3/5.3 = -8-3/5.3/1 =$
$-8/1 - 9/5 = -40/5 - 9/5 =$
$-49/5_{//}$

$a_{32} = (-3^2) - (-2^2) - 3/5(3.2) =$
$-9+4-3/5.6 = -5-3/5.6/1 =$
$-5/1 - 18/5 = -25/5 - 18/5 =$
$-43/5_{//}$ ✓

$a_{33} = (-3^2) - (-3^2) - 3/5(3.3) =$
$-9+9-3/5.9 = 0-3/5.9 =$
$-3/5.9/1 = -27/5_{//}$

$a_{34} = (-3^2) - (-4^2) - 3/5(3.4) =$
$-9+16-3/5.12 = +7-3/5.12/1 =$
$+7/1 - 36/5 = +35/5 - 36/5 =$
$-1/5_{//}$

1.2) $A = (a_{ij})_{3\times3}$ tal que $a_{ij} = 2.f(i) + 3.f(j)$, para $f(x) = 2.(-x^2)+5$.

2.5

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}_{3\times3} ; A = \begin{bmatrix} 15 & -3 & -33 \\ 3 & -15 & -45 \\ -17 & -35 & -65 \end{bmatrix}_{3\times3}$$

$f(1) = 2.(-1^2)+5 = 2.(-1)+5 = -2+5 = +3_{//}$
$f(2) = 2.(-2^2)+5 = 2.(-4)+5 = -8+5 = -3_{//}$
$f(3) = 2.(-3^2)+5 = 2.(-9)+5 = -18+5 = -13_{//}$ ✓

$a_{11} = 2.f(i)+3.f(j) =$
$2.f(1)+3.f(1) = 2.3+3.3 =$
$6+9 = +15_{//}$

$a_{12} = 2.f(1)+3.f(2) =$
$2.3+3.(-3) = 6-9 = -3_{//}$

$a_{13} = 2.f(1)+3.f(3) =$
$2.3+3.(-13) = 6-39 =$
$-33_{//}$

$a_{21} = 2.f(2)+3.f(1) =$
$2.(-3)+3.3 = -6+9 = +3_{//}$

$a_{22} = 2.f(2)+3.f(2) =$
$2.(-3)+3.(-3) = -6+(-9) =$
$-6-9 = -15_{//}$

$a_{23} = 2.f(2)+3.f(3) =$
$2.(-3)+3.(-13) = -6+(-39)$
$-6-39 = -45_{//}$

data fecha 29.04.24

$a_{31} = 2.f(3) + 3.f(1) =$
$2.(-13) + 3.3 =$
$-26 + 9 = -17$

$a_{32} = 2.f(3) + 3.f(2) =$
$2.(-13) + 3.(-3) =$
$-26 - 9 = -35$

$a_{33} = 2.f(3) + 3.f(3) =$
$2.(-13) + 3.(-13) =$
$-26 - 39 = -65$

2) (2.5) Determinar x, y, a e b tal que:

$$\begin{bmatrix} 1/2x+5y & 3a-5b \\ -7x+31/4y+3 & 2a+7b \end{bmatrix}_{2x2} = \begin{bmatrix} 2y+2 & 0 \\ 1/3x-5 & 1 \end{bmatrix}_{2x2}$$

$$\begin{cases} 1/2x+5y = 2y+2 \\ -7x+31/4y+3 = 1/3x-5 \end{cases}$$

$$\begin{cases} 1/2x+5y-2y = +2 \\ -7x+31/4y-1/3x = -5-3 \end{cases}$$

$$\begin{cases} 1/2x+3y = +2 \\ -7/1x-1/3x+31/4y = -8 \end{cases}$$

$$\begin{cases} 1/2x+3y = +2 \\ -22/3x+31/4y = -8 \end{cases}$$

eliminando o x:

$$\begin{cases} 1/2x+3y = +2 \quad .(22/3) \\ -22/3x+31/4y = -8 \quad .(1/2) \end{cases}$$

$$\begin{cases} 1/2x(22/3)+3y(22/3) = 2.(22/3) \\ -22/3x(1/2)+31/4y(1/2) = -8.(1/2) \end{cases}$$

$$\rightarrow \begin{cases} 22/6x+66/3y = 44/3 \\ -22/6x+31/8y = -8/2 \end{cases}$$

$$\begin{cases} 22/6x+22y = 44/3 \\ -22/6x+31/8y = -4 \end{cases} +$$

$$0+22y+\frac{31}{8}y = \frac{44}{3}-\frac{4}{1} =$$

$$\frac{176y+31y}{8} = \frac{44-12}{3} =$$

$$\frac{179y}{8} = \frac{32}{3} \Rightarrow y = \frac{32.8}{3.179} =$$

$$y = \frac{256}{537}$$

2.5

eliminando o y:

$$\begin{cases} 1/2x+3y = +2 \quad .31/4 \\ -22/3x+31/4y = -8 \quad .(-3) \end{cases}$$

$$\begin{cases} 1/2x(31/4)+3y(31/4) = 2.(31/4) \\ -22/3x(-3)+31/4y(-3) = -8(-3) \end{cases}$$

data fecha 29.04.21

$$\begin{cases} 3/8x + 9/4y = 6/4 \\ +66/3x + (-9/4y) = +24 \end{cases}$$

$$\begin{cases} 3/8x + 9/4y = 3/2 \\ 22x - 9/4y = 24 \end{cases} +$$

$$\frac{22x}{1} + \frac{3x}{8} + 0 = \frac{3}{2} + \frac{24}{1}$$

$$\frac{176x + 3x}{8} = \frac{3 + 48}{2}$$

$$\frac{179x}{8} = \frac{51}{2} \Rightarrow x = \frac{51 \cdot 8}{179 \cdot 2}$$

$$x = \frac{408 : 2}{358 : 2} \Rightarrow \boxed{x = \frac{204}{179}}$$

$$\begin{cases} 3a - 5b = 0 \\ 2a + 7b = 1 \end{cases}$$

eliminando o a:

$$\begin{cases} 3a - 5b = 0 & \cdot(-2) \\ 2a + 7b = 1 & \cdot 3 \end{cases}$$

$$\begin{cases} -6a + 10b = 0 \\ 6a + 21b = 3 \end{cases} +$$

$$0 + 31b = 3$$

$$\boxed{b = \frac{3}{31}}$$

eliminando o b:

$$\begin{cases} 3a - 5b = 0 & \cdot 7 \\ 2a + 7b = 1 & \cdot 5 \end{cases}$$

$$\begin{cases} 21a - 35b = 0 \\ 10a + 35b = 5 \end{cases} +$$

$$31a + 0 = 5$$

$$\boxed{a = \frac{5}{31}}$$

$$x = \frac{204}{179} \qquad y = \frac{256}{537}$$

$$a = \frac{5}{31} \qquad b = \frac{3}{31}$$

3) (2.5) Determinar x, y, z e t tal que se tenha

$$2 \begin{bmatrix} x^2 & 2x & y \\ 4 & s & t^2 \end{bmatrix}_{2\times 3} = \begin{bmatrix} x & x & 3 \\ z & 5t & t \end{bmatrix}_{2\times 3}$$

1.5

$x^2 - x = 0$ calcular x_1 e x_2 | idem | $t^2 = t$

$x^2 = x$	$2x = x$	$y = 3$	$4 = z$	$5 = 5t$	$t^2 = t$
$x = \pm\sqrt{x}$	$x = \frac{x}{2}$		$z = 4$	$\frac{5}{5} = t$	$t = \pm\sqrt{t}$
					$t = \pm\sqrt{1}$
a_{11} ↑	a_{12} ↑	a_{13} ↑	a_{21} ↑	$t = 1$	$t = \pm 1$
X	X			a_{22} ↑	a_{23} ↑ X

data fecha 30.04.21

4) (2.5) Dada a matriz $A_{3\times3}$, determinar:

$$\begin{bmatrix} 3/5 & 2 & 4/5 \\ 5 & 1/2 & -7 \\ 2/3 & 9 & 0 \end{bmatrix}_{3\times3}$$

4.1) O valor de $a_{11} - \frac{[a_{11}.a_{13} - (a_{13})^2]}{(a_{13} + a_{11})}$ =

$$\frac{3}{5} - \frac{\left[\frac{3}{5}.\frac{4}{5} - \left(\frac{4}{5}\right)^2\right]}{\frac{4}{5}+\frac{3}{5}} = \frac{\frac{3}{5} - \left[\frac{12}{25} - \frac{16}{25}\right]}{\frac{7}{5}} = \frac{\frac{3}{5}}{\frac{1}{1}}$$

5, 175	5
1, 35	5
7	7
1	175

$$\frac{\frac{3}{5}}{\frac{1}{1}} - \frac{\left[\frac{-4}{25}\right]}{\frac{7}{5}} = \frac{3.1}{5.1} - \frac{(-4).5}{25.7} = \frac{3}{5} - \frac{(-20)}{175} = \longrightarrow$$

$$\frac{105+20}{175} = \frac{125:25}{175:25} = \boxed{\frac{5}{7}}$$

2.5

4.2) O valor de $a_{13} + a_{22}.a_{23} - (a_{31})^2$ =

$$\frac{4}{5} + \frac{1}{2}.\frac{(-7)}{1} - \left(\frac{2}{3}\right)^2 = \frac{4}{5} + \frac{(-7)}{2} - \frac{4}{9} = \frac{4}{5} - \frac{7}{2} - \frac{4}{9} =$$

$$\frac{+72-315-40}{90} = \frac{+72-355}{90} = \boxed{\frac{-283}{90}}$$

2, 5, 9	2
1, 5, 9	3
1, 5, 3	3
1, 5, 1	5
1, 1, 1	90

Gabriel Gonçalves de Oliveira