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Profª Dra. Marisa Atsuko Nitto — Matemática — 1° ADS

Lista de Exercícios — Aula 20

1) Determinar x e y tal que os pares ordenados sejam iguais.

1.1) $(-5/2x - 7y, \; -5x + 3/4y + 9) = (3y + 2, \; 1/5x - 15)$

$\begin{cases} -5/2x - 7y = 3y + 2 \\ -5x + 3/4y + 9 = 1/5x - 15 \end{cases}$ $\longrightarrow$ $\begin{cases} -5/2x - 7y - 3y + 2 = 2 \\ -5x - 1/5x + 3/4y + 9 = -15 - 9 \end{cases}$

$\begin{cases} -5/2x - 10y = 2 \\ -25/5x - 1/5x + 3/4y = -24 \end{cases}$ $\longrightarrow$ $\begin{cases} -5/2x - 10y = 2 \\ -26/5x + 3/4y = -24 \end{cases}$

$\begin{cases} -5/2x - 10y = 2 & .(26/5) \\ -26/5x + 3/4y = -24 & .(-5/2) \end{cases}$

$\begin{cases} -130/10x - 260/5y = 52/5 \\ 130/10x - 15/8y = 120/2 \end{cases}$ $\longrightarrow$ $Y = \dfrac{-352.8}{435.5}$

$\begin{cases} -13x - 52y = 52/5 \quad + \\ 13x - 15/8y = 60 \end{cases}$ $\boxed{Y = -\dfrac{2816}{2155}}$

0

$\dfrac{-15y - 52y.(8)}{8} = \dfrac{52}{5} + \dfrac{60.(5)}{5}$

$\dfrac{-15y - 416y}{8} = \dfrac{52 + 300}{5} \quad .(-1)$

$\dfrac{+435y}{8} = \dfrac{-352}{5}$

$$\begin{cases} -5/2x - 10y = 2 \\ -26/5x + 3/4y = -24 \end{cases}$$

$$\begin{cases} -5/2x - 10y = 2 & \cdot (3/4) \\ -26/5x + 3/4y = -24 & \cdot (10) \end{cases}$$

$$\begin{cases} -15/8x - 30/4y = 6/4 : 2 \\ -260/5x + 30/4y = -240 \end{cases}$$

$$\dfrac{-15x - 416x}{8} = \dfrac{3 - 480}{2}$$

$$\begin{cases} -15/8x - 30/4y = 3/2 \\ -52x + 30/4y = -240 \end{cases} +$$

$$\dfrac{-431x}{8} = \dfrac{-477}{2} \cdot (-1)$$

$$\overline{0}$$

$$\dfrac{431x}{8} = \dfrac{477}{2} \times$$

$$-\dfrac{15x}{8} - \dfrac{52x}{1} = \dfrac{3}{2} + \dfrac{(-240)}{1}$$

$$x = \dfrac{477 \cdot 8}{431 \cdot 2}$$

$$x = \dfrac{3816}{862} : 2 \Rightarrow \boxed{x = \dfrac{1908}{431}}$$

+ Portanto, $x = \dfrac{1908}{431}$ e $x = -\dfrac{2816}{2155}$.

2) $(x + 5/3y + 9,\ -7x + 2x - y) = (-7/2x + 3,\ 3/8y - 11)$

$$\begin{cases} x + 5/3y = -7/2x + 3 \\ -7x + 2x - y = 3/8y - 11 \end{cases}$$

$$\begin{cases} x + 7/2x + 5/3y = 3 \\ -7x + 2x - y - 3/8y = -11 \end{cases}$$

$$\begin{cases} 2/2x + 7/2x + 5/3y = 3 \\ -5x - 8/8y - 3/8y = -11 \end{cases}$$

$$\begin{cases} 9/2x + 5/3y = 3 & \cdot (5) \\ -5x - 11/8y = -11 & \cdot (9/2) \end{cases}$$

$$\begin{cases} 45/2x + 25/3x = 15 \\ -45/2x - 99/16y = -99/2 \end{cases} +$$

$$\dfrac{103y}{48} = \dfrac{-69}{2} \times$$

$$\overline{0}$$

$$y = \dfrac{-69 \cdot 48}{103 \cdot 2}$$

$$\dfrac{25y}{3} - \dfrac{99y}{16} = -\dfrac{99}{2} + \dfrac{15}{1}$$

$$y = -\dfrac{3312}{206} : 2 \Rightarrow \boxed{y = -\dfrac{1656}{103}}$$

$$\dfrac{\cancel{75y} + 400y - 297y}{48} = \dfrac{-99 + 30}{2}$$

$$\begin{cases} 9/2x + 5/3y = 3 & \cdot (11/8) \\ -5x - 11/8y = -11 & \cdot (5/3) \end{cases}$$

$$\begin{cases} 99/16x + 55/24y = 33/8 \\ -25/3x - 55/24y = -55/3 \end{cases} +$$

$$\overline{\quad\quad\quad 0 \quad\quad\quad}$$

$$\frac{99x}{16} - \frac{25x}{3} = \frac{33}{8} + \frac{(-55)}{3}$$

$$\frac{297x - 400x}{48} = \frac{99 - 440}{24}$$

$$\frac{-103x}{48} = \frac{-341}{24}$$
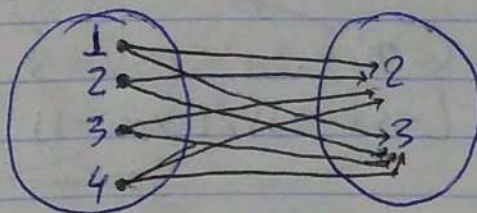
$$x = \frac{-341 \cdot 48}{-103 \cdot 24}$$

$$x = \frac{16368 : 24}{2472 : 24} \Rightarrow \boxed{x = \frac{682}{103}}$$

→ Portanto, $x = \dfrac{682}{103}$ e $y = \dfrac{-1656}{103}$.

2) Dados os conjuntos $A = \{1, 2, 3, 4\}$, $B = \{2, 3\}$ e $C = \{1, 4, 5, 6, 7\}$, determinar:

2.1) $A \times B$ e fazer o diagrama de Venn

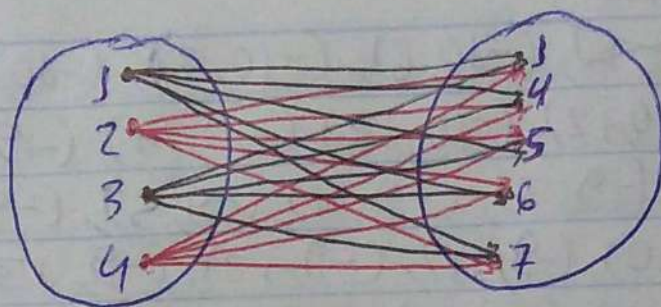$A \times B = \{(1,2), (1,3), (2,2), (2,3), (3,2), (3,3), (4,2), (4,3)\}$

$n(A \times B) = n(A) \times n(B)$
$= 4 \times 2 \Rightarrow n = 8$

2.2) $A \times C$ e fazer o diagrama de Venn

$A \times C = \{(1,1), (1,4), (1,5), (1,6), (1,7), (2,1), (2,4), (2,5), (2,6), (2,7),$
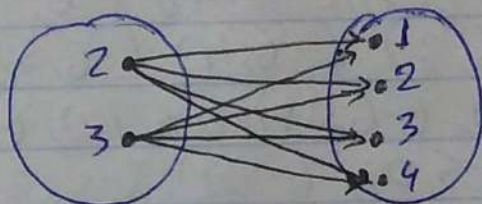$(3,1), (3,4), (3,5), (3,6), (3,7), (4,1), (4,4), (4,5), (4,6), (4,7)\}$

↓

$$n(A \times B^c) = n(A) \times n(B^c)$$
$$= 4 \cdot 5 \Rightarrow n = \underline{20}$$

2.3) $B \times A$ e fazer o diagrama de Venn

$$B \times A = \{(2,1),(2,2),(2,3),(2,4),(3,1),(3,2),(3,3),(3,4)\}$$

$$n(B \times A) = n(B) \times n(A)$$
$$= 2 \cdot 4 \Rightarrow n = \underline{8}$$

3) Dados os conjuntos $A = \{x \in \mathbb{Z} \,/\, -12 \le x \le 5\}$,
$B = \{y \in \mathbb{Z} \,/\, -3 < y \le 14\}$, $C = \{-3,-1,0,1,2,3,4,7,8,9\}$
e $D = \{-2,-1,0,1,3,5,7,8,14\}$, determinar:

$A = \{-12,-11,-10,-9,-8,-7,-6,-5,-4,-3,-2,-1,0,1,2,3,4\}$

~~$B = \{-3,-1,0~$~~

$B = \{-2,-1,0,1,2,3,4,5,6,7,8,9,10,11,12,13,14\}$

$C = \{-3,-1,0,1,2,3,4,7,8,9\}$

$D = \{-2,-1,0,1,3,5,7,8,14\}$

3.1) $A \times B$ e fazer o diagrama de Venn

$A \times B = \{(-12,-2),(-12,-1),(-12,0),(-12,1),(-12,2),(-12,3),(-12,4),~(-12,5),$
$(-12,5),(-12,6),(-12,7),(-12,8),(-12,9),(-12,10),(-12,11),(-12,12),(-12,13),$
$(-12,14),(-11,-2),(-11,-1),(-11,0),(-11,1),(-11,2),(-11,3),(-11,4),$
$(-11,5),(-11,5),(-11,6),(-11,7),(-11,8),(-11,9),(-11,10),(-11,11),(-11,12),$
$(-11,13),(-11,14),(-10,-2),(-10,-2),(-10,-1),(-10,0),(-10,1),(-10,2),$

(-10,5)

(-10,3), (-10,4), ~~(-10,5)~~, (-10,6), (-10,7), (-10,8), (-10,9),
(-10,10), (-10,11), (-10,12), (-10,13), (-10,14), (-9,-2), (-9,-1),
(-9,0), (-9,1), (-9,2), (-9,3), (-9,4), (-9,5), (-9,6), (-9,7),
(-9,8), (-9,9), (-9,10), (-9,11), (-9,12), (-9,13), (-9,14),
(-8,-2), (-8,-1), (-8,0), (-8,1), (-8,2), (-8,3), (-8,4),
(-8,5), (-8,6), (-8,7), (-8,8), (-8,9), (-8,10), (-8,11),
(-8,12), (-8,13), (-8,14), (-7,-2), (-7,-1), (-7,0), (-7,1),
(-7,2), (-7,3), (-7,4), (-7,5), (-7,6), (-7,7), (-7,8), (-7,9),
(-7,10), (-7,11), (-7,12), (-7,13), (-7,14), (-6,-2), (-6,-1),
(-6,0), (-6,1), (-6,2), (-6,3), (-6,4), (-6,5), (-6,6),
(-6,7), (-6,8), (-6,9), (-6,10), (-6,11), (-6,12), (-6,13),
(-6,14), (-5,-2), (-5,-1), (-5,0), (-5,1), (-5,2), (-5,3),
(-5,4), (-5,5), (-5,6), (-5,7), (-5,8), (-5,9), (-5,10),
(-5,11), (-5,12), (-5,13), (-5,14), (-4,-2), (-4,-1), (-4,0),
(-4,1), (-4,2), (-4,3), (-4,4), (-4,5), (-4,6), (-4,7), (-4,8),
(-4,9), (-4,10), (-4,11), (-4,12), (-4,13), (-4,14), (-3,-2),
(-3,-1), (-3,0), (-3,1), (-3,2), ~~(-3,3)~~ (-3,3), ~~(-3,4)~~ (-3,4),
(-3,5), (-3,6), (-3,7), (-3,8), (-3,9), (-3,10), (-3,11), (-3,12),
(-3,13), (-3,14), (-2,-2), (-2,-1), (-2,0), (-2,1), (-2,2), (-2,3),
(-2,4), (-2,5), (-2,6), (-2,7), (-2,8), (-2,9), (-2,10), (-2,11),
(-2,12), (-2,13), (-2,14), (-1,-2), (-1,-1), (-1,0), (-1,1),
(-1,2), (-1,3), (-1,4), (-1,5), (-1,6), (-1,7), (-1,8), (-1,9),
(-1,10), (-1,11), (-1,12), (-1,13), (-1,14), ~~(0)~~ (0,-2), (0,-1),
(0,0), (0,1), (0,2), (0,3), (0,4), (0,5), (0,6), (0,7), (0,8), (0,9),
(0,10), (0,11), (0,12), (0,13), (0,14), (1,-2), (1,-1), (-1,0), (1,1),
(1,2), (1,3), (1,4), (1,5), (1,6), (1,7), (1,8), (1,9), (1,10),
(1,11), (1,12), (1,13), (1,14), (2,-2), (2,-1), (2,0), (2,1), (2,2),
(2,3), (2,4), (2,5), (2,6), (2,7), (2,8), (2,9), (2,10), (2,11),
(2,12), (2,13), (2,14), (3,-2), (3,-1), (3,0), (3,1), (3,2),
(3,3), (3,4), (3,5), (3,6), (3,7), (3,8), (3,9), (3,10), (3,11),

$(3,12), (3,13), (3,14), (4,-2), \cancel{} (4,-1), (4,0), (4,1),$
$(4,2), (4,3), (4,4), (4,5), (4,6), (4,7), (4,8), (4,9),$
$(4,10), (4,11), (4,12), (4,13), (4,14)\}$
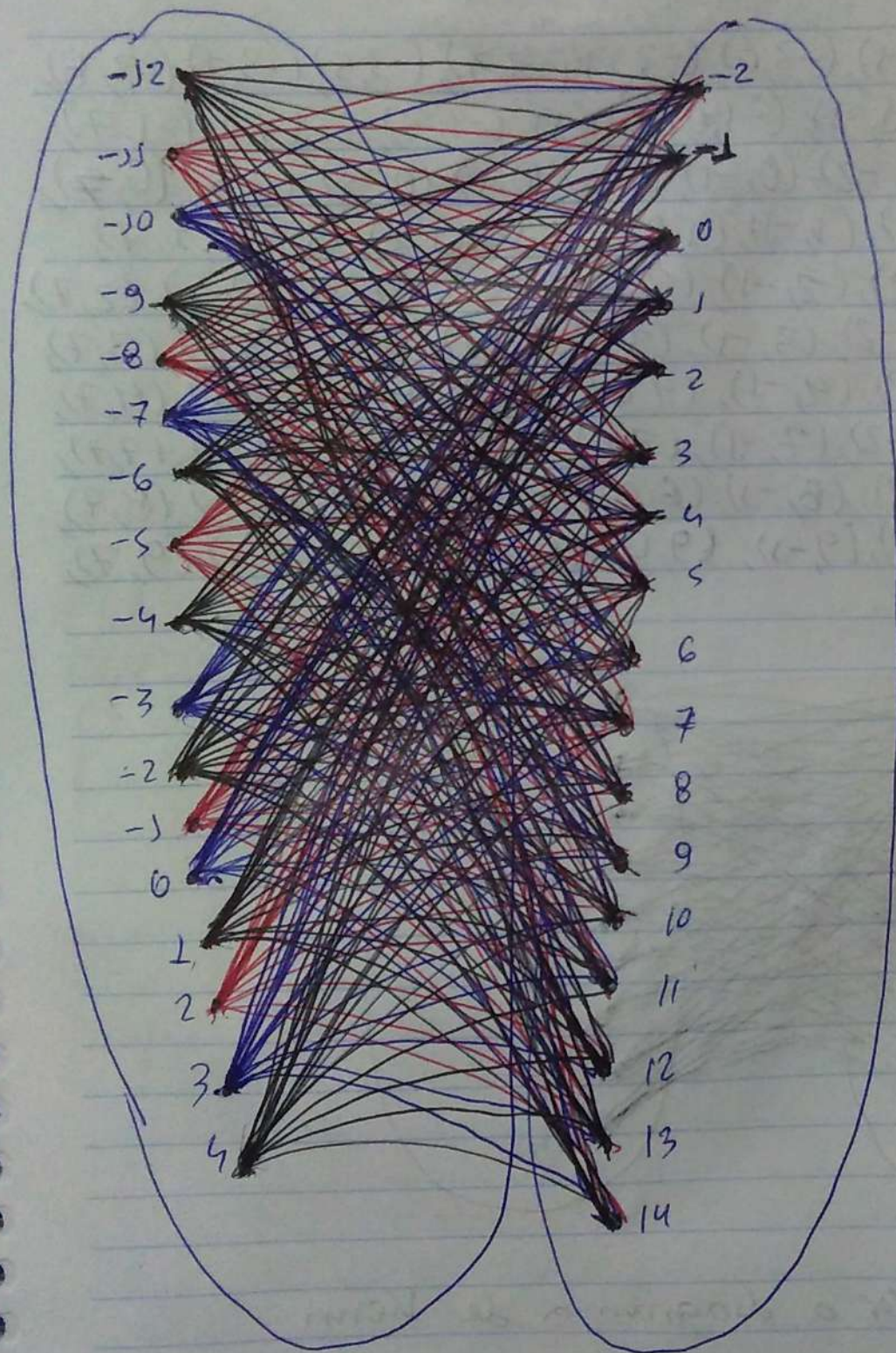
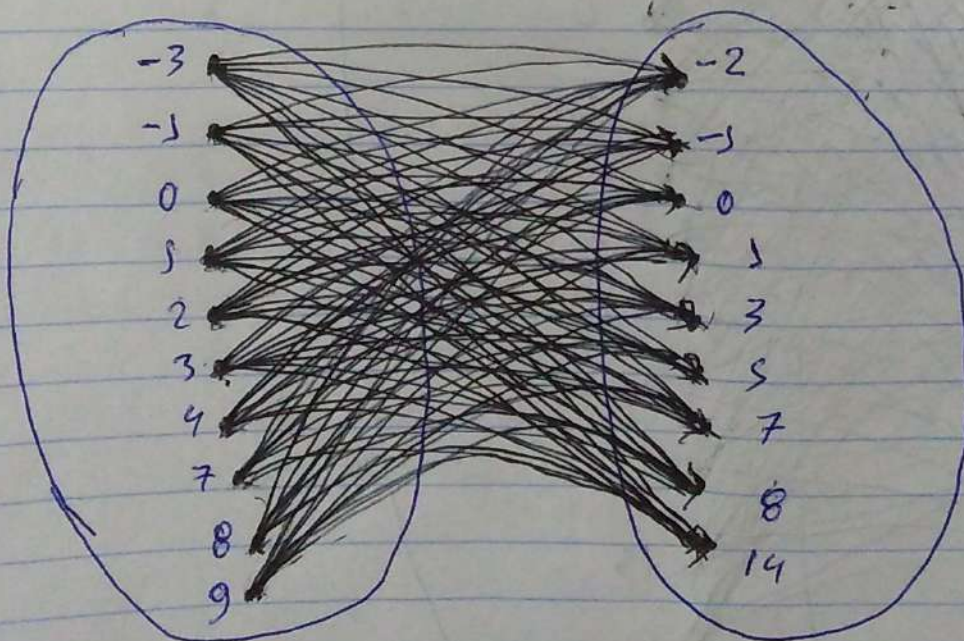$n(A \times B) = n(A) \times n(B)$
$= 17 \times 17 \Rightarrow n = 289$

3.2) C×D e fazer o diagrama de Venn
C = {-3, -1, 0, 1, 2, 3, 4, 7, 8, 9}
D = {-2, -1, 0, 1, 3, 5, 7, 8, 14}

C×D = {(-3,-2), (-3,-1), (-3,0), (-3,1), (-3,3), (-3,5), (-3,7), (-3,8),
(-3,14), (-1,-2), (-1,-1), (-1,0), (-1,1), (-1,3), (-1,5), (-1,7),
(-1,8), (-1,14), (0,-2), (0,-1), (0,0), (0,1), (0,3), (0,5), (0,7),
(0,8), (0,14), (1,-2), (1,-1), (1,0), (1,1), (1,3), (1,5), (1,7),
(1,8), (1,14), (2,-2), (2,-1), (2,0), (2,1), (2,3), (2,5), (2,7),
(2,8), (2,14), (3,-2), (3,-1), (3,0), (3,1), (3,3), (3,5), (3,7),
(3,8), (3,14), (4,-2), (4,-1), (4,0), (4,1), (4,3), (4,5), (4,7),
(4,8), (4,14), (7,-2), (7,-1), (7,0), (7,1), (7,3), (7,5), (7,7),
(7,8), (7,14), (8,-2), (8,-1), (8,0), (8,1), (8,3), (8,5), (8,7),
(8,8), (8,14), (9,-2), (9,-1), (9,0), (9,1), (9,3), (9,5), (9,7),
(9,8), (9,14)}

3.3) B×C e fazer o diagrama de Venn

$B = \{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$

$C = \{-3, -1, 0, 1, 2, 3, 4, 7, 8, 9\}$

$B \times C = \{(-2,-3), (-2,-1), (-2,0), (-2,1), (-2,2), (-2,3), (-2,4), (-2,7),$
$(-2,8), (-2,9), (-1,-3), (-1,-1), (-1,0), (-1,1), (-1,2), (-1,3), (-1,4),$
$(-1,7), (-1,8), (-1,9), (0,-3), (0,-1), (0,0), (0,1), (0,2), (0,3),$
$(0,4), (0,7), (0,8), (0,9), (1,-3), (1,-1), (1,0), (1,1), (1,2),$
$(1,3), (1,4), (1,7), (1,8), (1,9), (2,-3), (2,-1), (2,0), (2,1),$
$(2,2), (2,3), (2,4), (2,7), (2,8), (2,9), (3,-3), (3,-1), (3,0),$
$(3,1), (3,2), (3,3), (3,4), (3,7), (3,8), (3,9), (4,-3), (4,-1),$
$(4,0), (4,1), (4,2), (4,3), (4,4), (4,7), (4,8), (4,9), (5,-3),$
$(5,-1), (5,0), (5,1), (5,2), (5,3), (5,4), (5,7), (5,8), (5,9),$
$(6,-3), (6,-1), (6,0), (6,1), (6,2), (6,3), (6,4), (6,7), (6,8),$
$(6,9), (7,-3), (7,-1), (7,0), (7,1), (7,2), (7,3), (7,4), (7,7),$
$(7,8), (7,9), (8,-3), (8,-1), (8,0), (8,1), (8,2), (8,3), (8,4),$
$(8,7), (8,8), (8,9), (9,-3), (9,-1), (9,0), (9,1), (9,2), (9,3), (9,4),$
$(9,7), (9,8), (9,9), (10,-3), (10,-1), (10,0), (10,1), (10,2),$
$(10,3), (10,4), (10,7), (10,8), (10,9), (11,-3), (11,-1), (11,0),$
$(11,1), (11,2), (11,3), (11,4), (11,7), (11,8), (11,9), (12,-3),$
$(12,-1), (12,0), (12,1), (12,2), (12,3), (12,4), (12,7), (12,8),$
$(12,9), (13,-3), (13,-1), (13,0), (13,1), (13,2), (13,3), (13,4),$
$(13,7), (13,8), (13,9), (14,-3), (14,-1), (14,0), (14,1), (14,2),$
$(14,3), (14,4), (14,7), (14,8), (14,9)\}$
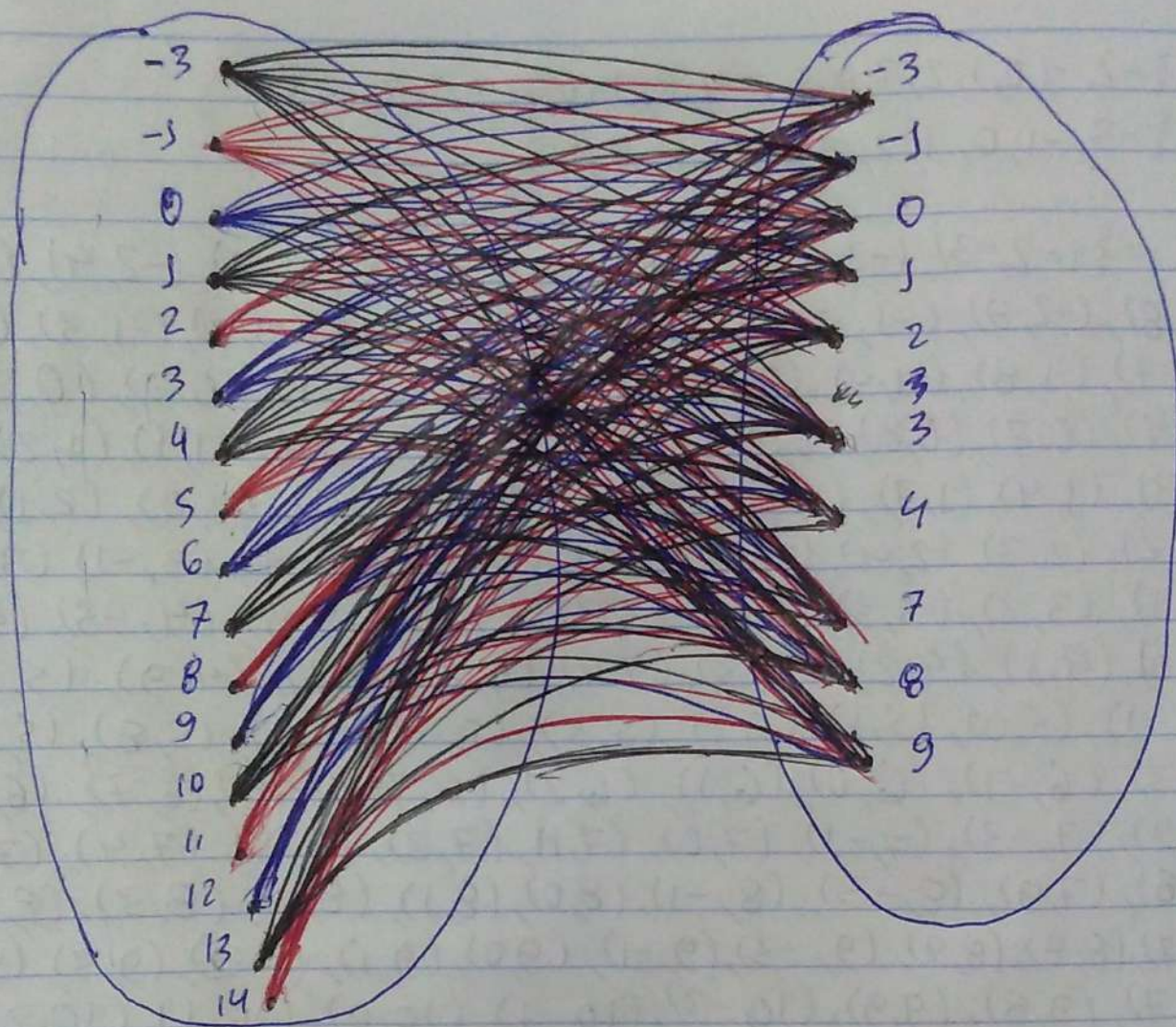
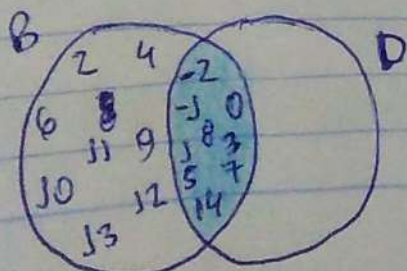## 3.4) A operação e o diagrama de Venn de (C∩A) − (B∩D)
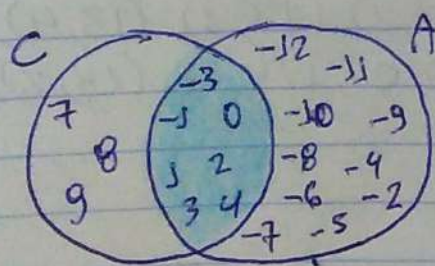
C∩A

$C \cap A = \{-12, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, -3, -1, 0, 1, 2, 3, 4\}$
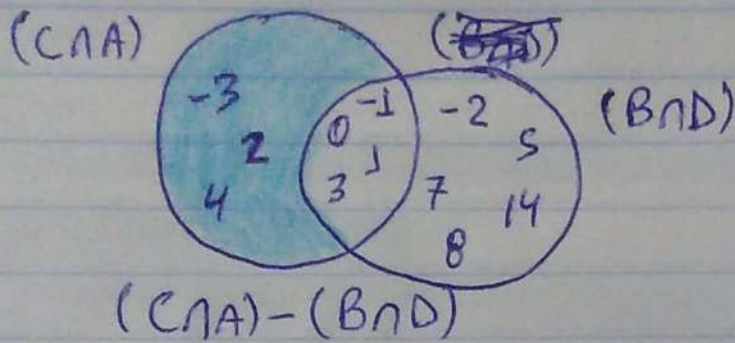
$C \cap A = \{-3, -1, 0, 1, 2, 3, 4\}$

B∩D

$B \cap D = \{-2, -2, -1, -1, 0, 0, 1, 1, 2, 3, 3, 4, 5, 5, 6, 7, 7, 8, 8, 9, 10, 11, 12, 13, 14, 14\}$

$B \cap D = \{-2, -1, 0, 1, 3, 5, 7, 8, 14\}$

(C∩A)   (B∩D)   (B∩D)

-3
2
4
0 -1
3 1
-2
7
8
5
14

(C∩A) - (B∩D)

$(C \cap A) - (B \cap D) = \{-3, -2, -1, -1, 0, 0, 1, 1, 2, 3, 3, 4, 5, 7, 8, 14\}$

$(C \cap A) - (B \cap D) = \{-3, 2, 4\}$

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