Lista 2

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Problema 15 - $A = \{0,1,2,3,4\}$

a) $\{\{0,2\},\{1\},\{3,4\}\}$

$R = \{(0,0),(0,2),(2,0),(2,2),(1,1),(3,3),(3,4),(4,3),(4,4)\}$

b) $\{\{0\},\{1,3,4\},\{2\}\}$

$R = \{(0,0),(1,1),(1,3),(1,4),(3,1),(3,3),(3,4),(4,1),(4,3),(4,4),(2,2)\}$

c) $\{\{0\},\{1,2,3,4\}\}$

$R = \{(0,0),(1,1),(1,2),(1,3),(1,4),(2,1),(2,2),(2,3),(2,4),(3,1),(3,2),$
$(3,3),(3,4),(4,1),(4,2),(4,3),(4,4)\}$

Problema 16.

a) $A = \{0,1,2,3,4\}$, $R = \{(0,0),(0,4),(1,1),(1,3),(2,2),(3,1),(3,3),(4,0)$
$(4,4)\}$

$[0] = \{0,4\}$, $[1] = \{1,3\}$, $[2] = \{2\}$, $[3] = \{1,3\}$, $[4] = \{0,4\}$

b) $A = \{a,b,c,d\}$, $R = \{(a,a),(b,b),(b,d),(c,c),(d,b),(d,d)\}$

$[a] = \{a\}$, $[b] = \{b,d\}$, $[c] = \{c\}$, $[d] = \{b,d\}$

c) $A = \{1,2,3,\ldots,20\}$, $R = \{(x,y) \in A^2 : 4 \text{ divide } (x-y)\}$

$[1] = \{1,5,9,13,17\}$ $\quad [5] = [9] = [17]$

$[2] = \{2,6,10,14,18\}$ $\quad [6] = [10] = [14] = [18]$

$[3] = \{3,7,11,15,19\}$ $\quad [7] = [11] = [15] = [19]$

$[4] = \{4,8,12,16,20\}$ $\quad [8] = [12] = [16] = [20]$

16 - D) $A = \{(6,3), (2,4), (-4,-8), (3,9), (1,5), (3,6),$

$R = \{(\{a,b\}, \{c,d\}) \in A^2 : ad = bc\}$

$[1,3] = \{(3,9)\}$, $[2,4] = \{(-4,-8), (3,6)\}$

$[-4,-8] = \{(2,4), (3,6)\}$, $[3,9] = \{1,3\}$, $[1,5] = \{1,5\}$

$[3,6] = \{(-4,-8), (2,4)\}$

E) $A = P(X)$ $X = \{a,b,c,d\}$; $[\emptyset] = \{\emptyset\}$

$[\{a\}] = \{\{a\}, \{b\}, \{c\}, \{d\}\}$

$[\{a,b\}] = \{\{a,b\}, \{a,c\}, \{a,d\}, \{b,c\}, \{b,d\}, \{c,d\}$

$[\{a,b,c\}] = \{\{a,b,c\}, \{a,b,d\}, \{a,c,d\}, \{c,b,d\}$

$[\{a,b,c,d\}] = \{\{a,b,c,d\}\}$

Problema 17 -

a) $R = \{(x,y) \in \mathbb{R}^2 : x \leq y\}$

1) reflexiva? xRx, $\forall x \in R$ ✓

2) ANTI-SIMETRICA? xRy e $yRx \Rightarrow x = y$ ✓

3) Transitiva? xRy e $yRz \Rightarrow xRz$

b) $R = \{(x,y) \in \mathbb{R}^2 : x^2 \leq y^2\}$

1) Reflexiva? xRx, $\forall x \in R$ ✓

2) ANTI-SIMETRICA? xRy e $yRx \Rightarrow x = y$ ✓

3) TRANSITIVA? xRy e $yRz \Rightarrow xRz$

c) $R = \{(m,n) \in \mathbb{Z}^2 : m+n$ é Par$\}$

1) Reflexiva? sim

2) ANTI SIMETRICA? sim

3) TRANSITIVA? sim

17 - D) $R = \{(X, Y) \in P(A)^2 : X \subseteq Y\}$, $P(A)$ é o conjunto dos Partes de A

1) se $A = \emptyset \Rightarrow P(A) = \{\emptyset\} \Rightarrow R = \{(\emptyset, \emptyset\}$, Nesse caso Reflexiva, ANTI-simetrica e transitiva? Sim

2) se $A \neq \emptyset$. Nesse caso $P(A)$ tem mais elementos alem de $\emptyset$ Reflexiva e transitiva? Sim

ANTI-simetrica? NÃO