Primeira Atividade Extra Classe - Lógica e Conjuntos

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Turma: MV41S - ADS

1) a) $(p \leftrightarrow q) \rightarrow (q \rightarrow p)$

p	q	$(p \leftrightarrow q)$	$\rightarrow$	$(q \rightarrow p)$
0	0	1	1	1
0	1	0	1	0
1	0	0	1	1
1	1	1	1	1

(Implicação Lógica)

b) $\sim(p \vee q) \leftrightarrow (\sim p \wedge \sim q)$

$\sim p$	$\sim q$	$(p \vee q)$	$\sim(p \vee q)$	$\leftrightarrow (\sim p \wedge \sim q)$
1	1	1	0	1
1	0	1	0	0
0	1	1	0	0
0	0	0	1	0

(Não é equivalência Lógica)

2) a) V_r, $r(x,y): 5 \mid (2x + y)$ $A = \{1, 3, 4\}$ $B = \{2, 3, 5\}$

$5 \mid (2 \times 1 + 2) \rightarrow 5 \mid 4$ (Falso) $(1,2)$ ✗

$5 \mid (2 \times 1 + 3) \rightarrow 5 \mid 5$ (T) $(1,3)$ ✓

$5 \mid (2 \times 1 + 5) \rightarrow 5 \mid 7$ (F) $(1,5)$ ✗

$5 \mid (2 \times 3 + 2) \rightarrow 5 \mid 8$ (F) $(3,2)$ ✗

$5 \mid (2 \times 3 + 3) \rightarrow 5 \mid 9$ (F) $(3,3)$ ✗

$5 \mid (2 \times 3 + 5) \rightarrow 5 \mid 11$ (F) $(3,5)$ ✗

$5 \mid (2 \times 4 + 2) \rightarrow 5 \mid 10$ (V) $(4,2)$ ✓

$5 \mid (2 \times 4 + 3) \rightarrow 5 \mid 11$ (F) $(4,3)$ ✗

$5 \mid (2 \times 4 + 5) \rightarrow 5 \mid 13$ (F) $(4,5)$ ✗

$(3,5)$

$5 \mid 9 + 2$

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

b) $p(x): 2x + 6 \geq 0$ e $q(x): -2x + 2 > 0$

i $V_{\sim p}$: $V_p: 2x \geq -6$

$V_p = \{x \in \mathbb{R} \mid x \geq -3\}$

$V_{\sim p} = \{x \in \mathbb{R} \mid x < -3\}$

ii. V_q $-2x > -2$

$V_{p \wedge q}$ $x > 1 \rightarrow x < 1$

$x \geq -3 \wedge x < 1$

$\{x \in \mathbb{R} \mid -3 \leq x \; 1\} = V_{p \wedge q}$

3) a) $\sim[(\forall x \in A)(p(x)) \wedge (\exists x \in A)(q(x))]$:

$(\forall x \in A)(p(x)) \vee$ [illegible] $(\forall x \in A) \sim (q(x))$

$(\exists x \in A) \sim (p(x)) \vee (\forall x \in A) \sim (q(x))$

b) $\sim[(\exists x \in \mathbb{R})(\forall y \in \mathbb{R})(|x| = x) \rightarrow (2y - 5 \neq 7)]$

$(\exists x \in \mathbb{R})(\exists y \in \mathbb{R})(|x| = x) \wedge (2y - 5 = 7)$

$\begin{array}{r} 162 \\ -64 \\ \hline 98 \end{array}$

4)

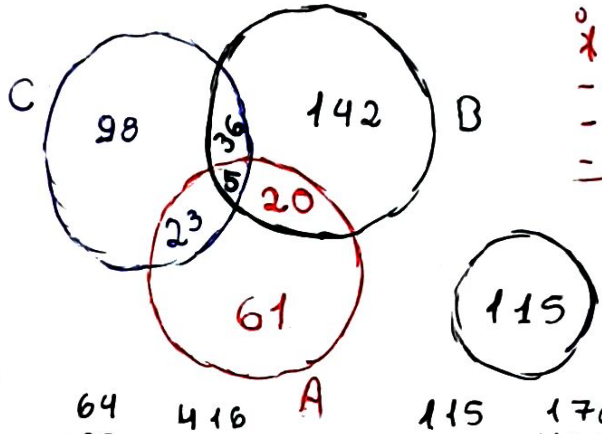
a) Nº consultados: 500

b) Só A: 61

c) A e C: 23

d) ao menos 2: 84

$\begin{array}{r} 203 \\ -36 \\ -5 \\ -20 \\ \hline 142 \end{array}$



$\begin{array}{r} 109 \\ -20 \\ -5 \\ -23 \\ \hline 61 \end{array}$ $\begin{array}{r} 162 \\ -23 \\ -5 \\ -36 \\ \hline 98 \end{array}$

$\begin{array}{r} 64 \\ +20 \\ \hline 84 \end{array}$ $\begin{array}{r} 416 \\ +84 \\ \hline 500 \end{array}$ $\begin{array}{r} 115 \\ +61 \\ \hline 176 \end{array}$ $\begin{array}{r} 176 \\ +142 \\ \hline 318 \end{array}$ $\begin{array}{r} 318 \\ +98 \\ \hline 416 \end{array}$

5) $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

$A = \{2, 3, 5, 7, 11, 13\}$ $B \cup C = \{1, 2, 3, 4, 6, 8, 12, 13\}$

$B = \{1, 2, 3, 4, 6, 8, 12\}$

$C = \{3, 8, 13\}$ $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13\}$

$A - (B \cup C) = \{5, 7, 11\}^c = \{0, 1, 2, 3, 4, 6, 8, 9, 10, 12, 13, 14, 15\}$

$(A \cup B)^c = \{9, 10, 14, 15\}$ | $(A \cup B)^c \cup C = \{3, 8, 9, 10, 13, 14, 15\}$

$[A - (B \cup C)]^c - [(A \cup B)^c \cup C] = \{0, 1, 2, 4, 6, 12\}$

6) $A \cap B = (\forall x \in U)(x \subset A \wedge x \subset B)$

$A \cap C = (\forall x \in U)(x \subset A \wedge x \subset C)$

$A^c \cap B = (\forall x \in U)(x \not\subset A \wedge x \subset B)$

$A^c \cap C = (\forall x \in U)(x \not\subset A \wedge x \subset C)$

Se (~~$A \cup A^c = U$~~) $A \cap B = A \cap C$ temos que B e C na interseção com A são iguais em seus elementos, já se $A^c \cap B = A^c \cap C$ também, temos ~~[illegible]~~ então que $B - A \cap B = C - A \cap C$, pois como A foi retirado da análise A^c é o resto do U, pois $A^c \cup A = U$, $C - A \cup C + A \cup B = B$: $C = B$