Exercícios

1. Dado o conjunto A = {0, 1, 2, {3} } diga se as proposições a seguir são verdadeiras ou falsas:

a) $0 \in A$ V b) $1 \subset A$ F c) $\{3\} \in A$ V

d) $3 \in A$ F e) $\{3\} \subset A$ F f) $\{1, 2\} \subset A$ V

g) $\varnothing \in A$ F h) $\{2, \{3\}\} \subset A$ V i) $\{1, 3\} \subset A$ F

j) $\varnothing \subset A$ V k) $\{\{3\}\} \in A$ F l) $\{\{3\}\} \subset A$ V

2. Sendo A = { 1, {2}, 5}. Usando : $\in$, $\notin$, $\subset$, $\supset$, $\not\subset$, $\not\supset$, relacione:

a) 5 $\in$ A b) {1} $\subset$ A c) {1,3} $\not\subset$ A

d) 2 $\notin$ A e) A $\supset$ {1, 5} f) {2} $\in$ A

g) {{2}} $\subset$ A h) A $\not\supset$ {2, 5} i) A $\subset$ {{2}}

j) 2 $\notin$ A l) {1,{2}} $\subset$ A m) A $\not\subset$ { 1, 2}

3. Sendo $\mathbb{N}$ = { 0, 1, 2, 3, 4, . . . } determine , por extensão, os seguintes conjuntos:

a) $A = \{ x \in \mathbb{N} \mid x^2 + x - 42 = 0\} = \{6\}$ $x' = 6$ $x'' = -7$

b) $B = \{ x \in \mathbb{N} \mid x = k+2 , k \in \mathbb{N}\} = \{2, 3, 4, 5, \ldots\}$

c) $C = \{ x \in \mathbb{N} \mid x = 2k, k \in \mathbb{N}\}, = \{2, 4, 6, \ldots\}$

d) $D = \{ x \in \mathbb{N} \mid x^2 - 4x + 3 = 0\} = \{1, 3\}$

e) $E = \{x \in \mathbb{N} \mid 1 < x \leq 5\} = \{2, 3, 4, 5\}$

f) $F = \{x \in \mathbb{N} \mid x^2 - x - 12 = 0\} = \{4\}$ $x' = -3$ $x'' = 4$

g) $g = \{x \in \mathbb{N} \mid 2x^2 - 7x + 6 = 0\} = \{2\}$ $x' = 3/2$ $x'' = 2$

4. Escreva cada um dos conjuntos a seguir, por meio de uma linguagem simbólica:

a) A = {6, 7, 8} $= \{x \in \mathbb{N} / x \geq 6 \wedge x \leq 8\}$ ou $\{x \in \mathbb{N} / 6 \leq x \leq 8\}$

b) B = {4, 5, 6, 7, . . . } $= \{x \in \mathbb{N} / x \geq 4\}$ ou $\{x \in \mathbb{N} / x > 3\}$

c) C = {. . . , -5, -4, -3, -2, -1} $= \{x \in \mathbb{Z} / x \leq -1\}$ ou $\{x \in \mathbb{Z} / x < 0\}$

d) D = {-2, -1, 0, 1, 2, 3} $= \{x \in \mathbb{Z} / x \geq -2 \text{ e } x \leq 3\}$ ou $\{x \in \mathbb{Z} / -2 \leq x \leq 3\}$

5. Dados os conjuntos A = {0}; B = {0, 2}; C = { 2, 4, 6} e D = {0, 2, 4, 6}, identifique as sentenças verdadeiras:

a) $A \subset B$ V b) $B \subset C$ F c) $D \subset C$ F

d) $B \supset A$ V e) $A \supset B$ F f) $\varnothing \subset A$ V

g) $D \subset D$ V h) $B \supset D$ F i) $A \subset D$ F

6. Dados os conjuntos A = {0, 3, 5} e B = {5, 8}, determine: P(A) e P(B).

$P(A) = \{\{0\}, \{3\}, \{5\}, \{0,3\}, \{0,5\}, \{3,5\}, \{0,3,5\}\}$

$P(B) = \{\{5\}, \{8\}, \{5,8\}\}$

7. Dados os conjuntos A = {0, 1, 2, 3}, B = {1, 2, 3} e C = {2, 3, 4, 5},

Determine: $(A-B) \cap (B-C) = \{0\} \cap \{1\} = \varnothing$

8. Considere no conjunto S = {1, 2, 3, 4, 5, 6, 7, 8, 9} os subconjuntos: A = {2, 3, 5, 7} e B = {1, 3, 5, 7, 9}. Determine:

a) $A \cup B = \{1,2,3,5,7,9\}$ b) $A \cap B = \{3,5,7\}$ c) $A - B = \{2\}$

d) $B - A = \{1,9\}$ e) $S - A = \{1,4,6,8,9\}$ f) $S - B = \{2,4,6,8\}$

g) $B \cap (A \cup B) = \{1,3,5,7,9\}$ h) $A - (B \cap S) = \{2\}$ i) $S - (A \cup B) = \{4,6,8\}$

9. Sendo A = {1, 2, 3, 5}

B = {2, 4, 7, 8, 9}

C = {5, 8, 9}

Subconjuntos de S = {1, 2, 3, 4, 5, 6, 7, 8, 9}

Encontre:

a) $A \cup B = \{1,2,3,4,5,7,8,9\}$ b) $A \cap B = \{2\}$ c) $A - B = \{1,3,5\}$

d) $B - A = \{4,7,8,9\}$ e) $C \cap B = \{2,4,5,7,8,9\}$ f) $C - A = \{5,8,9\}$

g) $B \cap (A \cup B) = \{2,4,7,8,9\}$ h) $A - (B \cap C) = \{1,2,3,5\}$ i) $S - (A \cup B) = \{6\}$

10. Sejam A = {2, 4, 5, 6, 8},

B = {1,4,5, 9},

C = {2, 3, 4}

Encontre:

a) $A \cup B = \{1,2,4,5,6,8,9\}$ b) $A \cap B = \{4,5\}$ c) $A - C = \{5,6,8\}$

d) $B - A = \{1,9\}$ e) $C - (A \cap B) = \{2,3\}$ f) $C - (A \cap B) = \{2,3\}$

g) $B - (A \cap B) = \{1,9\}$ h) $A \cap A = \{2,4,5,6,8\}$ i) $C \cap (A - B) = \{2\}$

j) $(C \cap B) - A = \varnothing$ k) $(A \cap B) = \{4,5\}$ l) $B - (A \cap B) = \{1,9\}$

m) $(B - A) \cap (A - B) = \varnothing$ n) $(C \cup B) = \{1,2,3,4,5,9\}$ o) $(A - B) - C = \{6,8\}$

p) $A - (A \cap B) = \{2,6,8\}$ q) $(A \cap B) - A = \varnothing$ r) $(A \cup B) - (A \cap B) = \{1,2,6,8,9\}$

11. Dados os conjuntos

A = {1, 3, 5}

B = {0, 1, 2, 4}

E = {2, 4} e

F = {3, 5} subconjuntos de

S = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}

Determine:

a) $(A \cup B) \cap E = \{0,1,2,3,4,5\} \cap \{2,4\} = \{0,1,3,5\}$

b) $(A \cap B) \cup F = \{1\} \cup \{3,5\} = \{1,3,5\}$

c) $(A \cap B \cap E) \cup (E \cap F) = \emptyset \cup \emptyset = \emptyset$

d) $(A - B) \cup (E - F) = \{3,5\} \cup \{2,4\} = \{2,3,4,5\}$

e) $(B - E) \cap (A - F) = \{0,1\} \cap \{1\} = \{1\}$

f) $(F - A) \cup (E - B) = \emptyset \cup \emptyset = \emptyset$

12. Sejam A = {1, 3, 5} e B = {2, 4}.

Encontre:

a) A X B $= \{(1,2),(1,4),(3,2),(3,4),(5,2),(5,4)\}$

b) B X A $= \{(2,1),(2,3),(2,5),(4,1),(4,3),(4,5)\}$

c) $A^2 = \{(1,1),(1,3),(1,5),(3,1),(3,3),(3,5),(5,1),(5,3),(5,5)\}$

d) $B^2 = \{(2,2),(2,4),(4,2),(4,4)\}$

13. Sejam os conjuntos: A = {x, y}, B = {1, 3, 5} e C = {m, n} . Determine: A X B X C.

$A \times B \times C = \{(x,1,m),(x,1,n),(x,3,m),(x,3,n),(x,5,m),(x,5,n),$
$(y,1,m),(y,1,n),(y,3,m),(y,3,n),(y,5,m),(y,5,n)\}$