Laboratorio No.4

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19 de agosto del 2019

Ejercicio #1

1. $a := \{1, 2, 4, 8, 16, 32, 64\} \in d := \{n \in \mathtt{N} \mid \exists i \in \mathtt{N} \; . \; n = 2^i \wedge n < 100\}$
2. $b := \{n \; \in \mathtt{N} \mid \exists x \in \mathtt{N} \; . \; x = n/5\} \in f := \{n \in \mathtt{N} \mid \exists x \in \mathtt{N} \; . \; n = x + x + x + x + x\}$
3. $c := \{n \in \mathtt{N} \mid \exists x \in \mathtt{N} \; . \; n = x * x\} \in e := \{n \in \mathtt{N} \mid \exists x \in \mathtt{N} \; . \; x = \sqrt{n}\}$

Ejercicio #2

1. $a := \{n \in \mathtt{N} \mid \exists x \in \mathtt{N} x = n/15\}$
2. $c := \{n \in \mathtt{N} \mid \exists x \in \mathtt{N} x = n/5 \wedge x = n/4\}$
3. $d := \{a \forall \; 1 < x < a \; . \; a \; mod(x) \neq 0\}$
4. $b := \{a \mid a \subset P(\mathtt{N}) \mid \exists x \in \mathtt{N} \; . \; x/15 \; . \; \exists n \subset a \; . \; x = n/15\}$
5. $d := \{b \mid b \subset P(\mathtt{N}) \mid \exists x \in \mathtt{N} \; . \; x + x = 42\}$

Ejercicio #3

$Q(m) := \{n \in \mathtt{N} \mid n \; \leq \; m \; \wedge \; mcd \; \langle m, n \rangle = 1\}$
$mcd = \frac{m}{n}$

Ejercicio #4

1. $\; x \in \; \mathtt{N} \; . \; x + x = \{\langle x, x + x \rangle \mid x \in \; \mathtt{N}\}$
2. $\; x \in \; \mathtt{N} true = \{\langle x, true \rangle \mid \frac{x}{5}\} \cup \; x \in \; \mathtt{N} false = \{\langle x, false \rangle \mid \neg \frac{x}{5}\}$
3. $f \circ g \; \in P(N)$
4. $\{\langle x, f(gx) \rangle \mid x \in N \wedge f(x) \in N \wedge g(x) \subset f(x)$

Ejercicio #5

1. $f(x) = x^2$ surjectiva
2. $g(x) = \frac{1}{cos(x-1)}$ injectiva
3. $h(x) = 2x$ bijectiva
4. $w(x) = x + 1$ bijectiva

Ejercicio #6

1. $B_1 = \{(2 * n) \in \ N, n \in Z \land n > 0\}$
2. $B_{2a} = \{(2n + 1) \in N \ . \ n \in Z \land n > 0\}$
3. *Dominio*
   $B_2 = \{(2n + 1) \in N \ . \ n \in Z \land n > 0\}$
   Contradominio
   $B_2 = \{(2n + 1) \in N \ . \ n \in Z \land n < -1\}$