

## Hoja de trabajo No.4

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### Ejercicio #1

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

### Ejercicio #2

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

### Ejercicio #3

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

### Ejercicio #4

1.  $x \in \mathbb{N} . x + x = \{\langle x, x + x \rangle \mid x \in \mathbb{N}\}$
2.  $x \in \mathbb{N} \text{true} = \{\langle x, \text{true} \rangle \mid \frac{x}{5}\} \cup x \in \mathbb{N} \text{false} = \{\langle x, \text{false} \rangle \mid \neg \frac{x}{5}\}$
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.  $h(x) = 2x$  biyectiva
4.  $w(x) = x + 1$  biyectiva

## Ejercicio #6

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