Name: _____

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1. 10

(a) Let $A = \{x \in \mathbb{Z} : x^2 + 1 \text{ is even}\} \cap \{x \in \mathbb{Q} : x^2 \geq 1\}$. Write an explicit representation of A.

2. Let $f : \mathbb{N}^2 \to \mathbb{N}$ such that $f(x, y) = x^2 + y^2$.

    (a) (10 points) Is f a surjective function?

(b) (10 points) Is f a injective function?

3. (10 points) Let $R \subseteq (\mathbb{R}^2 \setminus \{(0,0)\}) \times (\mathbb{R}^2 \setminus \{(0,0)\})$ such that

$$(x_1, y_1) R (x_2, y_2) \iff \exists p \in \mathbb{R} \setminus \{0\} \ (px_1, py_1) = (x_2, y_2).$$

Check if R is an equivalence relation.