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.