Homework 11

MATH 300 | (due April 26) | April 19, 2024

Problem 1. Prove that for any n, $\mathbb{R}^n \sim \mathbb{R}$. [Hint: by induction on n, you can use the result from class that $\mathbb{R} \times \mathbb{R} \sim \mathbb{R}$.]

Homework 11

Problem 2. Prove that for every set A, $A \times A$ is an equivalence relation.

Homework 11

MATH 300 (due April 26) April 19, 2024

Problem 3. For each of the following relations check whether it is reflexive symmetric or transitive:

1. $\{\langle a, b\rangle \in \mathbb{N}^2 \mid a - b \equiv 0 (mod\ 2)\}$
2. $\{\langle X, Y\rangle \in P(\mathbb{R}) \times P(\mathbb{R}) \mid X \cap Y \neq \emptyset\}$
3. $\{\langle x, y\rangle \in (\mathbb{R} \setminus \{0\})^2 \mid xy > 0\}$
4. (*optional) $\{\langle f, g\rangle \in {}^{\mathbb{N}}\mathbb{N} \mid \exists N \in \mathbb{N} \forall n \geq N,\ f(n) = g(n)\}$

Problem 4. Prove that if R is a reflexive relation on A if and only if $id_A \subseteq R$.