

Concepts of Math: Recitation 6

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Basic Proofs

1. Prove that $\sqrt[3]{2}$ is not rational. This will be an example of proof by contradiction.
2. Prove that, $\forall x, y \in \mathbb{R}$, if $x + y = 7$ and $xy = 10$, then $x^2 + y^2 = 29$. This will be an example of direct proof.
3. Prove that, $\forall n \in \mathbb{N}$, if $2^n - 1$ is not divisible by 7, then n is not multiple of 3. This will be an example of proof by contrapositive.
4. Prove that there is no positive rational number that is smaller than all other positive rational numbers.

Induction

1. Use induction to prove that for all natural numbers n , $7 \mid (8^n - 1)$ (in other words, $8^n - 1$ is divisible by 7).
2. Use induction to prove that for all natural numbers n , $2^n > n$.