

Math Homework

John Doe

12/23/2025

Math Homework

Problem 1

From the definition of \mathcal{O}_J we need to show $\forall n \geq 0, \exists c \in \mathcal{O}_J \forall n \geq n_0, \exists a \in \mathbb{N}, \exists \epsilon \in \mathbb{R}, 2^n \leq a \cdot 2^n \leq 2^{n_0} \cdot 2^n$ (Choosing $c = 4$ and $n_0 = 0$, we need to show $a \leq 4 \cdot 2^n$ for every $n \geq 0$, which is true by part a).

Problem 2

a)

$$(6)(10) = 120$$

b)

$\sqrt[3]{x}$ is irrational.

Problem 3

$(3a, b \in \mathbb{N}, 2015^a + 1 = 16062b) \Rightarrow (3a, b \in \mathbb{N}, a = 2b)$ Since $P \Rightarrow Q$ is always True, the statement is true.