

Problem Solving

Set 19

21 July 2012

1. Let $0 < a < b$. Prove that

$$\int_a^b (x^2 + 1)e^{-x^2} dx \geq e^{-a^2} - e^{-b^2}.$$

2. If $n \in \mathbb{N}$ has the property that for all $x \in \mathbb{Z}$ there exists $y \in \mathbb{Z}$ such that $x^2 + y^2 \equiv 1 \pmod{n}$, show that n divides 12.