Bilkent University
Department of Mathematics

Problem Of The Month

Term: December 2024

Let S be a set consisting of 31 positive real numbers. For each non-empty subset $A \subset S$ let $f(A)$ be the product of all elements of A. We say that a subset $A \subset S$ is *rational* if $f(A)$ is a rational number. We say that a subset $A \subset S$ is *irrational* if $f(A)$ is an irrational number. Is there any set S having exactly 2023 rational subsets? Is there any set S having exactly 2025 irrational subsets?