# Problem of the Week
## Problem C and Solution
## The Smallest Part

### Problem

Suppose $N = 2^2 \times 3^2 \times 5^2 \times k$, where $k$ is a positive integer. If $N$ is divisible by 2025, then what is the smallest possible value for $k$?

$$N = 2^2 \times 3^2 \times 5^2 \times k$$

### Solution

First we note that $2025 = 3^4 \times 5^2$. Then, since $N$ is divisible by 2025, $N$ must have at least four factors of 3 and at least two factors of 5.

$N$ already has two factors of 3 and two factors of 5. Thus, $N$ needs at least two more factors of 3 in order to make it divisible by 2025. Therefore, the smallest possible value for $k$ is $3^2 = 9$.