

Problem Solving

Answers to Problem Set 7

10 July 2012

1. Let $n \geq 2$ be an integer. What is the minimal and maximal possible rank of an $n \times n$ matrix whose n^2 entries are precisely the numbers $1, 2, \dots, n^2$?
2. Show that every rational number $p/q \in (0, 1)$ with $q \geq 1$ can be represented uniquely in the form

$$\frac{p}{q} = \frac{a_1}{1!} + \frac{a_2}{2!} + \cdots + \frac{a_k}{k!},$$

with $0 \leq a_i < i$.