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SYNOPSIS

84 Six Ways to Count the Number of Integer Compositions
Amitabha Tripathi

In this article, for positive integers n and k, the author defines a composition of n into k (positive) parts as

> *an ordered k-tuple $(x_1, \ldots, x_k)$ with each $x_i \in \mathbb{N}$ and $x_1 + \cdots + x_k = n$. The x_i's are the* `parts` *of the composition. Thus $(1, 2, 2, 3)$ is a composition of 8 into 4 parts. If we denote by $p_k^\star(n)$ the number of compositions of n into k parts, it is a standard result in combinatorics that*
>
> $$p_k^\star(n) = \left|\left\{(x_1, \ldots, x_k) : x_1 + \cdots + x_k = n, x_i \geq 1\right\}\right| = \binom{n-1}{k-1}.$$

The author then goes on to prove the given result in six different ways.

89 Problems: 3793, 3811–3820

This month's "free sample" is:

3811. *Proposé par Jung In Lee, Seoul Science High School, Seoul, Republic of Korea.*

Déterminer toutes les fonctions $f : \mathbb{N} \to \mathbb{N}$ telles que, pour tous les entiers positifs a et b, $af(a + b) + bf(a) + b^2$ soit un carré parfait.

. . . .

3811. *Proposed by Jung In Lee, Seoul Science High School, Seoul, Republic of Korea.*

Determine all functions $f : \mathbb{N} \to \mathbb{N}$ such that for all positive integers a and b, $af(a + b) + bf(a) + b^2$ is a perfect square.

93 Solutions: 3676, 3711–3720