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Igor Konfisakher* (ikonfisa@artsci.wustl.edu) and **Michael Wijaya** (michaelwijaya84@yahoo.com). *Looking for Patterns in Multinomial Coefficients*. Preliminary report.

A non-trivial multinomial coefficient (of n) is a number of the form

$$\binom{n}{a_1, a_2, \dots, a_i} = \frac{n!}{a_1! \times a_2! \times \dots \times a_i!}$$

where

$$i \geq 2, a_j, n \in \mathbf{Z}^+, \sum_{k=1}^i a_k = n.$$

This research project attempts to answer the question: “For which pairs of integers, m and n do there exist non-trivial multinomial coefficients of m and n which are equal?” As we make progress on this problem, we find that it is in fact rather deeply rooted in some of the most fundamental aspects of number theory. (Received September 14, 2006)