

2018-2019 Undergraduate Problem Solving Contest

Problem Number 2

Due December 4, 2018

How many terms are there in the expansion of $(x + y + z)^{2018}$? (Please, DO NOT simplify or compute your answer, once you find it!) In general, how many terms are there in the expansion of $(x_1 + x_2 + \dots + x_k)^n$, where n and k are natural numbers?

Hint: Start with $(a + b)^2$, which has three terms, and consider how it can represent 3 ways to split 2 cookies among 2 people. Extend the problem to some number of cookies split among some number of people. You decide if k represents cookies or people and, the same for n .

New and old problems are posted online at
<http://www.math.utah.edu/undergrad/involvement.php>

In the spirit of UPSC, you should not use the internet or look up the solution in a book. Please include your name, student ID number, and email address on your solution. Submit answers at the front desk of the T. Benny Rushing Mathematics Center.