Answer on Question#37921 - <Math> - <Combinatorics | Number Theory>

Determine the number of ways to pick n fruits from k varieties of fruits where one picks at least l<k different fruits.

Solution:
the equation for the total number of fruits ($x_1, x_2 \ldots -$
amount of fruits from each variety):

$$x_1 + x_2 + \cdots + x_k = n$$

Number of solutions of the equation (the number of ways to pick n fruits from k varieties of fruits):

$$C_{n+k-1}^{k-1}$$

From this amount we must subtract the amount of the same fruits $\leq l-1$:

$$C_{n+k-1}^{k-1} - C_{l+k-2}^{l-1}$$

Answer: the number of ways to pick n fruits is equal to $C_{n+k-1}^{k-1} - C_{l+k-2}^{l-1}$.