Counting

Pascal Triangle
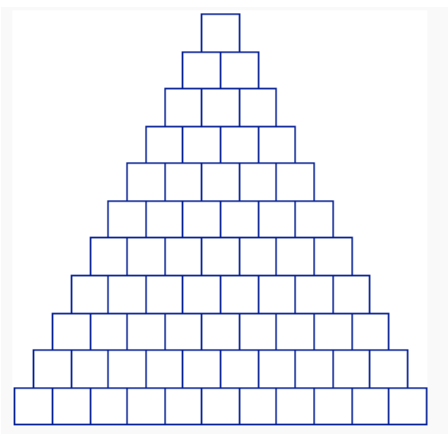
Learn how to solve this *type* of problems, not just this problem.

💡 *Tip: Always write down intermediate steps.*

(1) Construct a 7-row Pascal Triangle and then use it to expand the polynomial $(x + y)^6$.

(2) In which row of Pascal's Triangle do three consecutive entries occur that are in the ratio $3 : 4 : 5$?

(Ref 2707)

(3) How many elements in the 2016th row of the Pascal triangle are odd numbers?

(Ref 2709.)

(4) A triangular array of squares has one square in the first row, two in the second, and in general, k squares in the kth row for $1 \leq k \leq 11$. With the exception of the bottom row, each square rests on two squares in the row immediately below (illustrated in given diagram). In each square of the eleventh row, a 0 or a 1 is placed. Numbers are then placed into the other squares, with the entry for each square being the sum of the entries in the two squares below it. For how many initial distributions of 0's and 1's in the bottom row is the number in the top square a multiple of 3?

(Ref 2708: 2007 AIME II #13)