



## Thoughts On Pascal's Triangle And Corporate Elections

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In 1654, two giants of mathematics, Blaise Pascal and Pierre de Fermat, began to exchange letters about games of chance. This correspondence resulted in Pascal writing [Traité du triangle arithmétique, avec quelques autres petits traitez sur la mesme matière](#). This thin book, which was published posthumously, describes a triangular array of numbers and how the triangle may be used in probability problems. The triangle itself was not new, but it became known as Pascal's Triangle.

Below is a truncated illustration of Pascal's Triangle. It's easy to construct the triangle and much harder to explain it. Each number is the sum of the two numbers to the left and right above it. In the second row, for example, 2 is the sum of 1 and 1 above it (the row numbers begin with zero). You can actually keep going *ad infinitum*.

One of the neat features of Pascal's Triangle is that it allows you to determine the number possible combinations. This got me thinking about how to use Pascal's Triangle in the field of corporate law. Suppose we have 10 nominees for election to a 5 person board. What is the possible number of combinations of directors that can be elected? It would actually be pretty tedious to figure this out (as will be seen momentarily).

However, with Pascal's Triangle the answer can be determined in a glance. You simply go to row #10 (remember, the row numbers start with zero). The number in the first column in row #10 is 1 because there is only 1 way to elect no directors. The number in the second column is 10 because there are 10 ways to elect a single director. In the case of a 5 member board, the answer is that there are 252 possible combinations directors that could be elected from a pool of 10 nominees.

The same answer can be arrived at using the following formula:

$$\text{No. of Possible Combinations} = N!/S!(N-S)!$$

N is the number of nominees, S is the number of seats to be filled and ! denotes a factorial (*i.e.*, the product of all integers less than or equal to the integer in question). If there are 10 nominees and 5 seats to be filled, the calculation would be  $10!/5!(10-5)!$  or  $10*9*8*7*6*5*4*3*2*1/5*4*3*2*1(5*4*3*2*1)$  or 3,628,800/14,400 or 252. It's much easier to look at the pyramid!

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