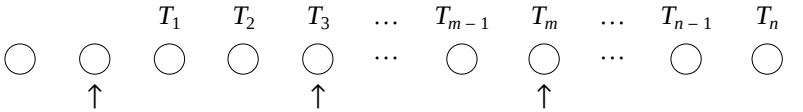
Reference

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99.10 Proof without words: $T_1 + T_2 + \ldots + T_n = \binom{n+2}{3}$



Underneath the symbols $T_1, T_2, \ldots, T_n$ place $(n + 2)$ balls, with two balls to the left of T_1. Three of these balls can be selected in $\binom{n+2}{3}$ ways. In the example shown, the second, fifth and $(m + 2)$th balls have been selected.

We interpret the third of these as the triangular number T_m and then the first two balls represent two numbers in the range from 1 to $m + 1$. We shall interpret these two numbers as an instruction for defining a unique dot amongst the T_m dots in the triangular array. The diagram below shows how this is done in the case when $m = 10$, but it is clearly completely general.

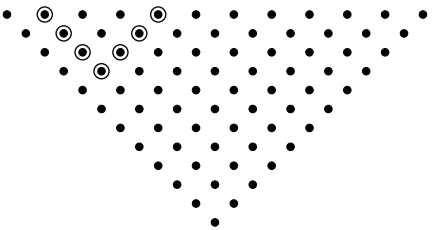


FIGURE 1

The diagram shows the array representing T_{m+1}, which can be thought of as a top row of $m + 1$ dots below which is the array for T_m. The second and fifth dots in the top row have been highlighted since the second and fifth balls were selected. Now these are used to pinpoint the second dot in the fourth row of T_{11} as the intersection of two diagonals in different directions. This is also the second dot in the third row of T_{10}. We now have a one-to-one correspondence between the $\binom{n+2}{3}$ choices of three objects from $n + 2$ objects and the totality of points in all the triangular arrays from T_1 to T_n, and this is enough to prove the result.

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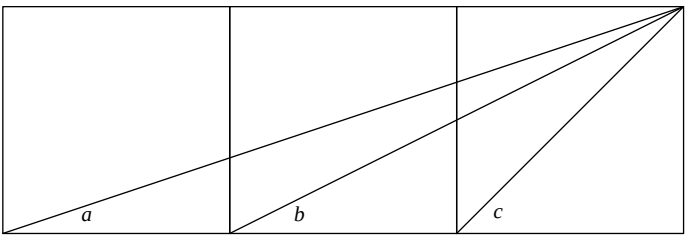
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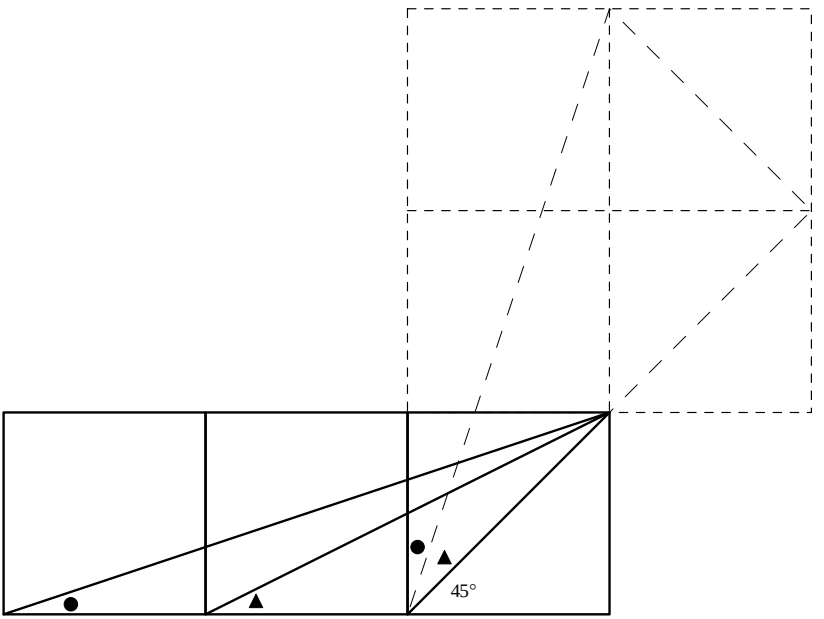
99.11 Proof without words: A problem on three squares

Theorem:



$$a + b + c = 90°$$

Proof:



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