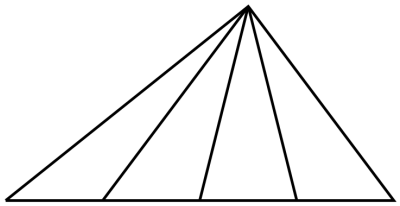
Counting

Count like a Pro

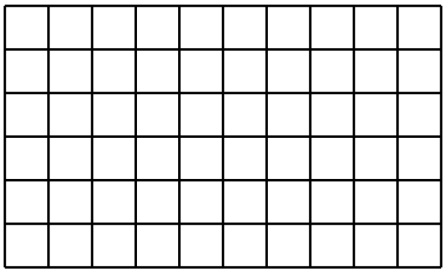
Learn how to solve this *type* of problems, not just this problem.

Tip: Always write down intermediate steps.

(1) How many triangles are there in the following diagram? Can you translate this question into the counting language?
(Ref: 2521)



(2) How many rectangles or squares are there in the following diagram? Can you translate this question into the counting language?
(Ref: 2522)



(3) How many different ways to form a line using 8 red balls and 2 white balls?

(4) How many different ways for two Britons, three Americans, and six Chinese to form a line?

(5) If we expand the polynomial $(x+y)^{10}$ and consolidate all the terms when possible, what is the coefficient of x^4y^6?

(6) Find the coefficient of x^{17} in the expansion of $(1+x^5+x^7)^{20}$.
(Ref 277: 2001 HK Team Selection)

(7) Two schools hold an annual chess tournament. Each team has 10 participants with a pre-determined order to play. In each round, the loser is eliminated and the winner plays against the next player from the opponent team. When all the 10 players of one team are eliminated, the tournament finishes.

If we record the progress of the entire tournament (i.e. who plays against whom, and in which round), how many different outcomes are possible?