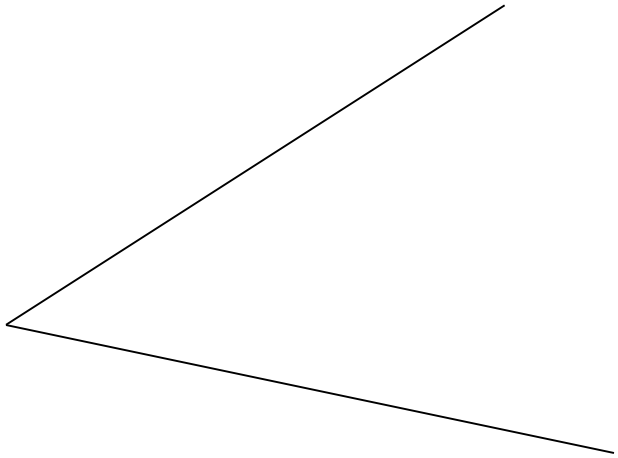
Pizza Cutting Problem: A Variation

What is the variation ?

- It is the same problem, except for the fact that instead of straight lines we use **bent lines**.

Bent lines

- Each line has exactly one bend, as shown below:



Statement

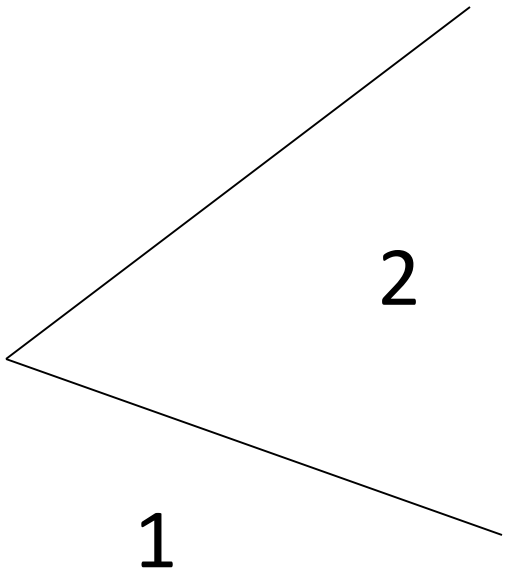
What is the number of regions determined by n bent lines.

Notation

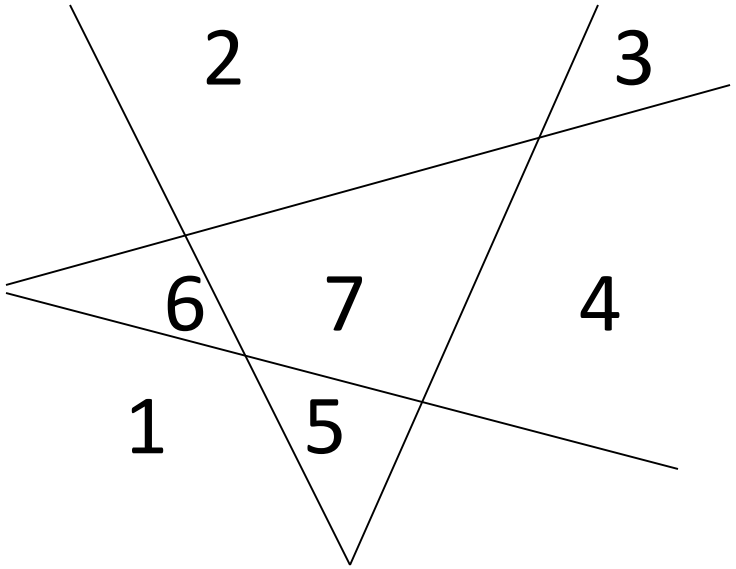
- Let Z_n be the number of regions determined by the bent lines.

- What is the value of Z_1 and Z_2 ?

$Z_1 = 2$

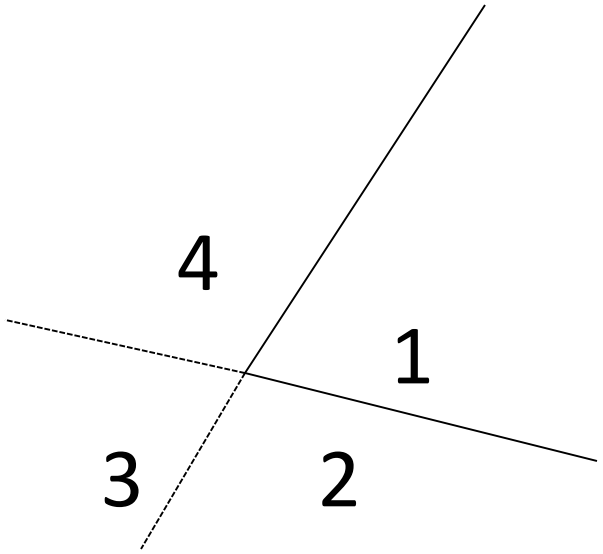


$$Z_2 = 7$$



What is Z_n

Hint: Try to relate it with the classical pizza cutting problem.



- A bent line is like **two** straight lines.

- Regions 2, 3, and 4 are **merged.**

$$Z_n = L_{2n} - 2n$$

Note : Here L_n is the regions produced by the n-lines in the original pizza cutting problem.