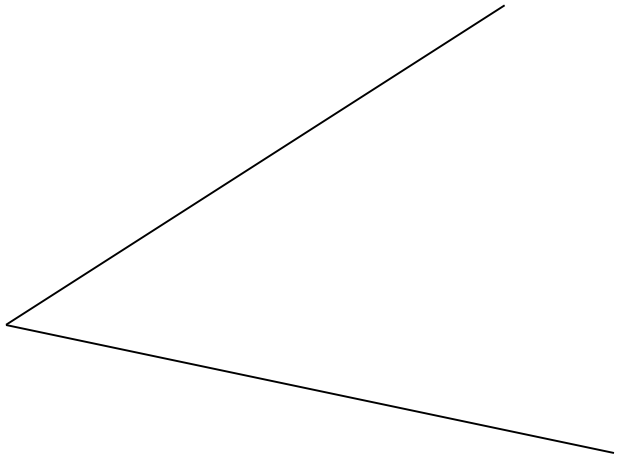
# Pizza Cutting Problem:  A Variation

# 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

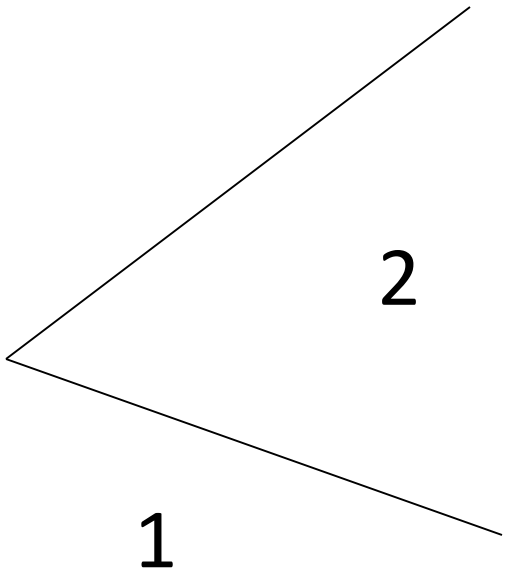
What is the number of regions determined by n bent lines.

# Notation

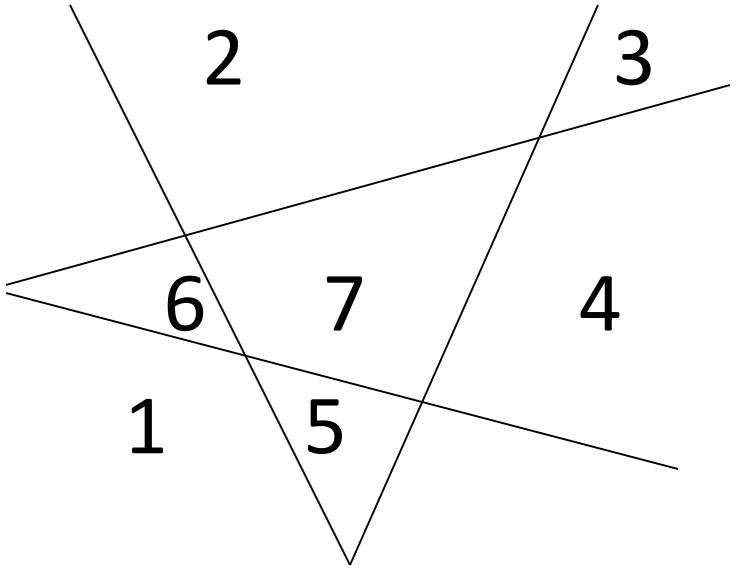
- Let $Z_n$ be the number of regions determined by the bent lines.

- What is the value of $Z_1$ and $Z_2$ ?

$$Z_1 = 2$$

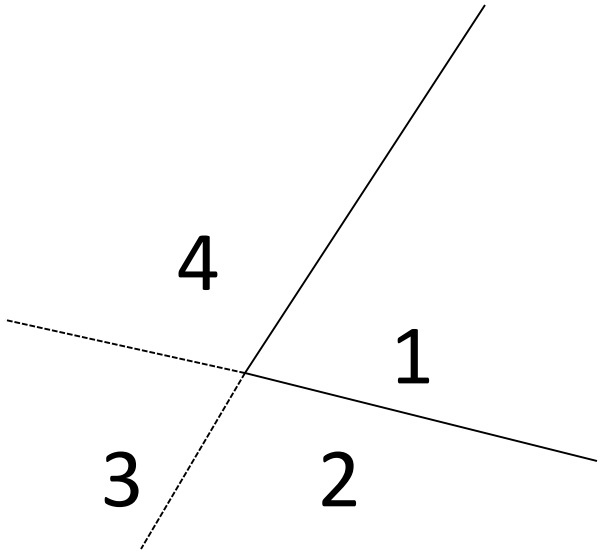


$$Z_2 = 7$$



# 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.