



Consider all configurations of nonattacking rooks on an $n \times n$ board up to dihedral action.

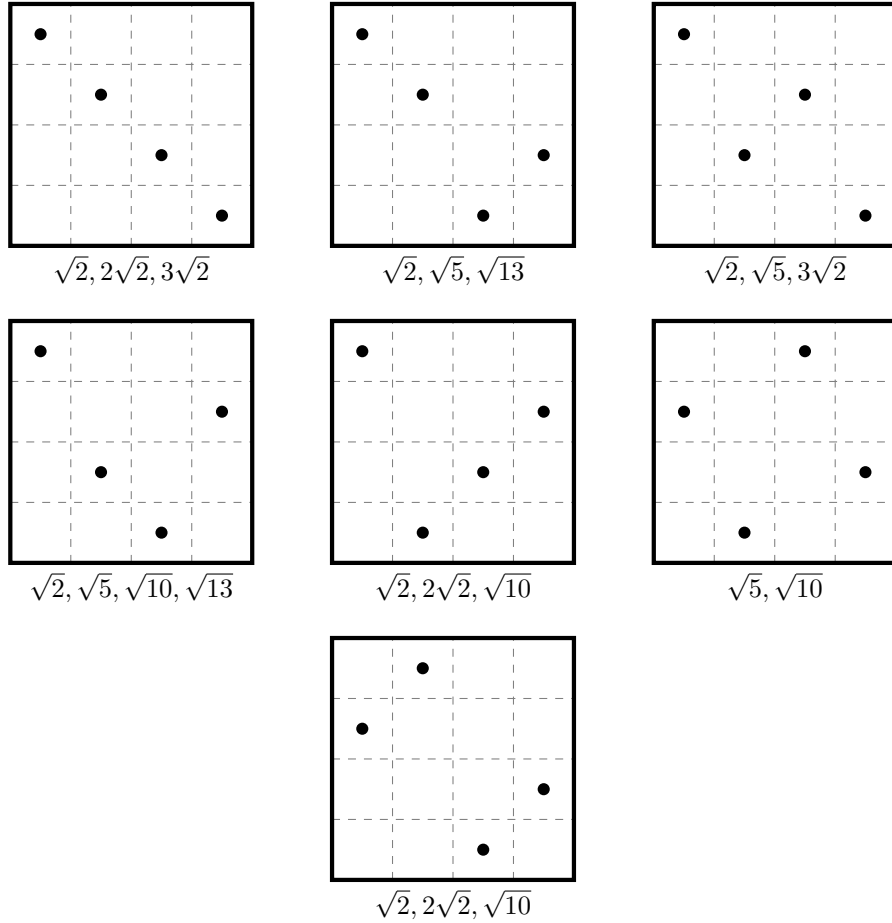


Figure 1: Each figure is marked with the distinct distances between pieces.

Question. What is the minimum number of distinct distances on such a figure?

Related.

1. What if rooks are allowed to be in attacking positions?
2. How many configurations of nonattacking rooks on the torus?
3. Are any configurations of nonattacking rooks on the torus that can be meaningfully called a “generalized Costas array”?

Note. The number of distinct boards is given by 1, 1, 2, 7, 23, 115, 694, 5282, ...

The maximum number of distances between pieces is 0, 1, 2, 4, 8, 11, 15, 20, ...

The minimum number of distances between pieces is 0, 1, 2, 2, 3, 5, 5, 6, ...

References.

https://en.wikipedia.org/wiki/Costas_array