

# Mathematical Games: What they are and how to use them

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«Il seroit bon que celui qui voudroit traiter cette matière [Probability / Mathematics], poursuivit l'examen des jeux de hazard, et généralement je souhaiterais qu'un habile Mathématicien voulut faire un ample ouvrage bien circonstancié et bien raisonné sur toute sorte de jeux, ce qui seroit de grand usage pour perfectionner l'art d'inventer; l'esprit humain paroissant mieux dans les jeux que dans les matières les plus serieuses.»

– W. G. Leibniz, ~1703, in Kurt Müller (ed.), 1962, *Sämtliche Schriften und Briefe*, p. 466

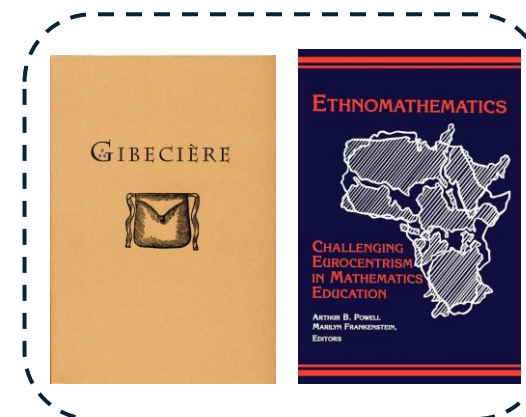
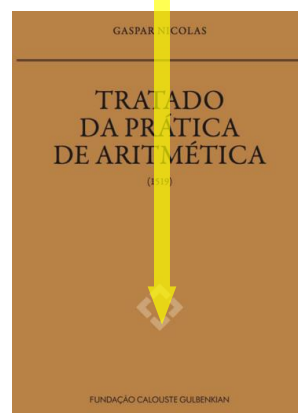
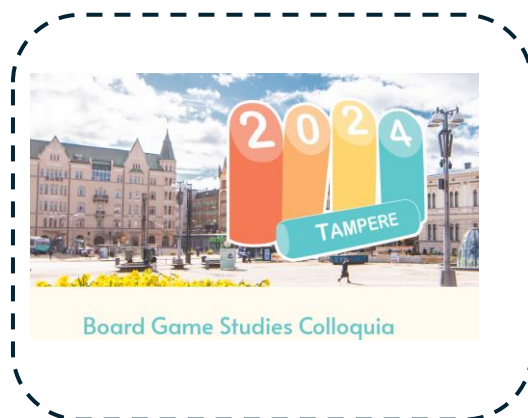
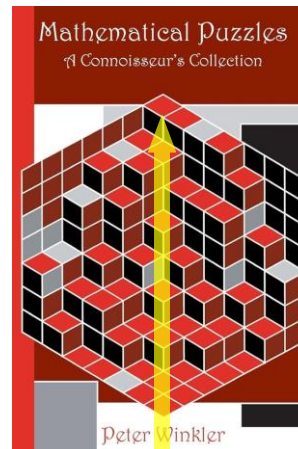
«[Hilbert's] mathematics may be a pretty game with formulas, more amusing even than chess; but what bearing does it have on cognition, since its formulas admittedly have no material meaning by virtue of which they could express intuitive truths.»

– Hermann Weyl, 1949, in *Philosophy of Mathematics and Natural Science*, Princeton University Press, p. 61

# Mathematics

# Games

- Abstraction;
- Concentration;
- Picturing / Analyse;
- Think first, act later;
- Weigh options;







Li voss' p. l'anno e mactano li neri. i. s. p. n. d.  
 d'apostola. p. d'apostola // p. d'apostola d'ella p.  
 d'apostola. o. i. d. p. d'apostola d'ella p.  
 i. b. p. d'apostola d'ella p. i. d. li d'apostola.



d'ella d'apostola. d'ella d'apostola. d'ella d'apostola.  
 d'ella d'apostola. d'ella d'apostola. d'ella d'apostola.  
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Représentation complète des pièces. Echelle 1:2

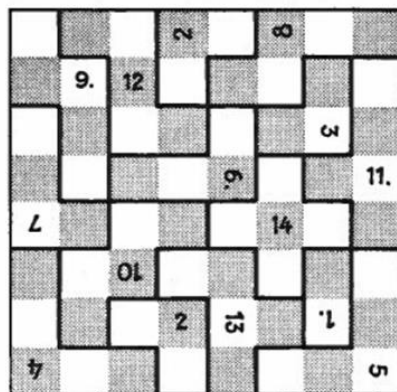
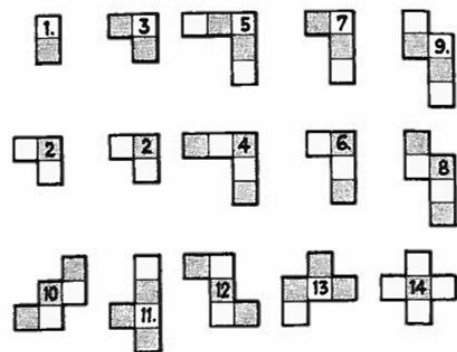


Fig. 2. Les pièces assemblées en l'échiquier

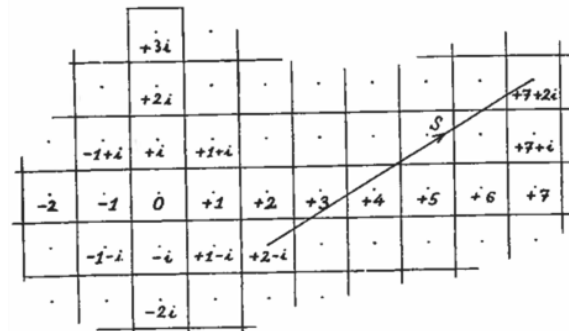


Fig. 1.

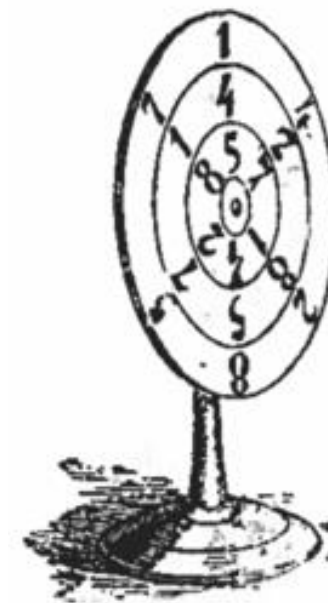


Fig. 1.

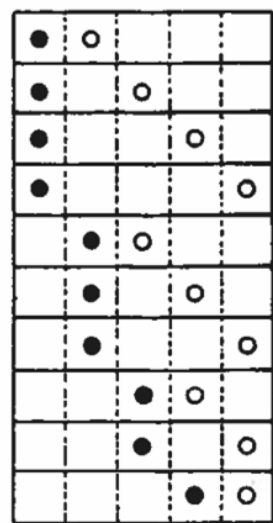


FIG.1

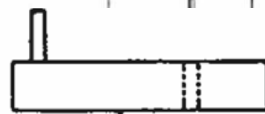


FIG. 2

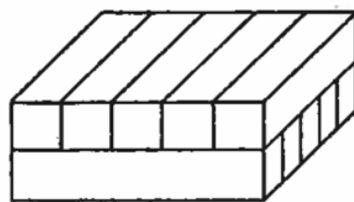


FIG. 3

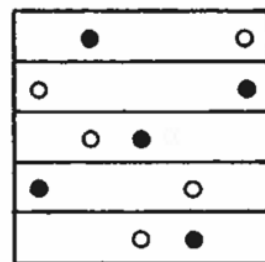
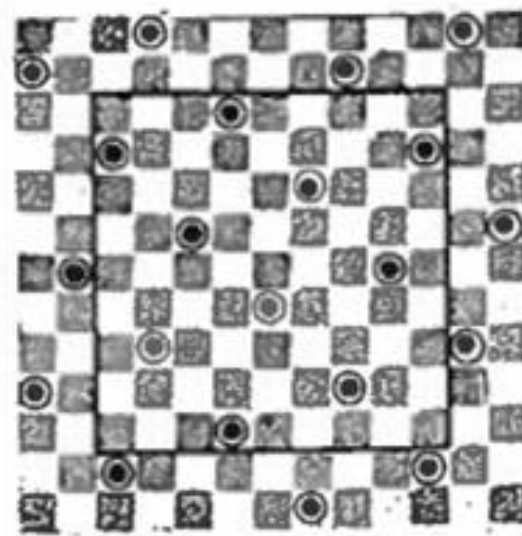
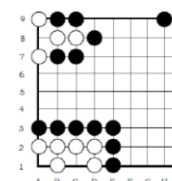
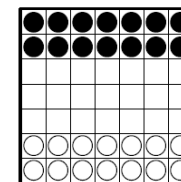
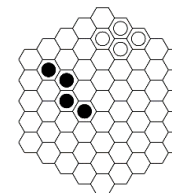
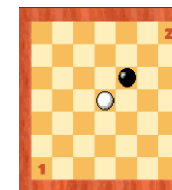
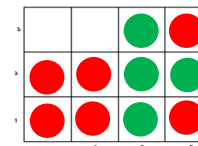


FIG.4



N. 3

# Portuguese National Championship of Mathematical Games





# Quiz

A

$>$

B

$<$

C

$=$

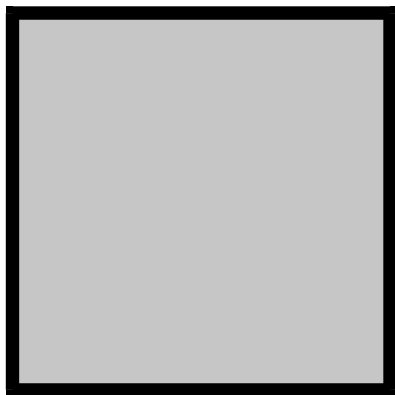
D

$\emptyset$

A



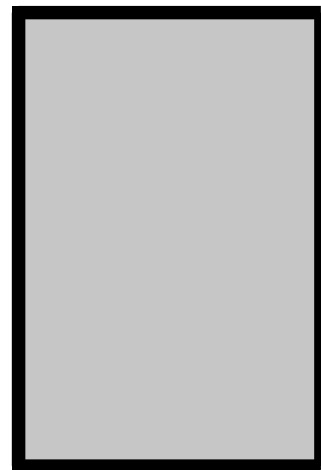
B



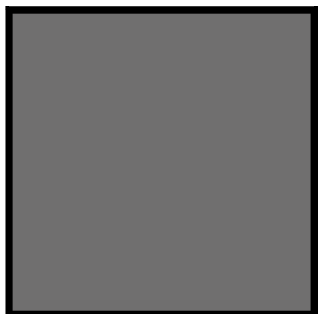
C



D



A



B



C



D



A

B

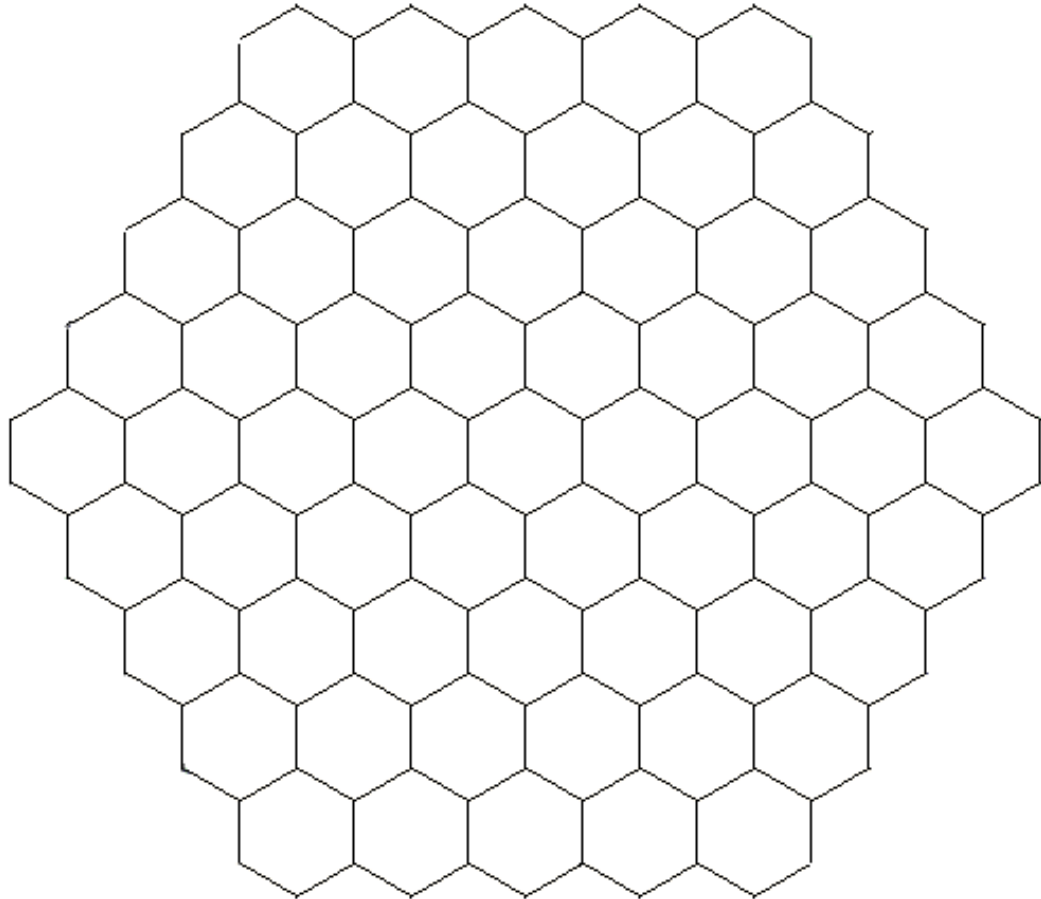
C

D

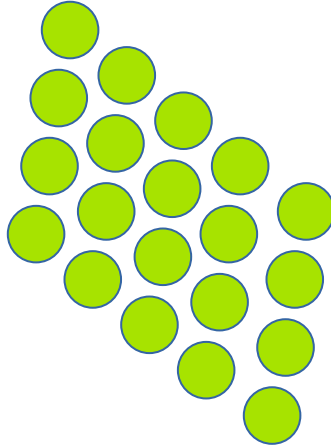
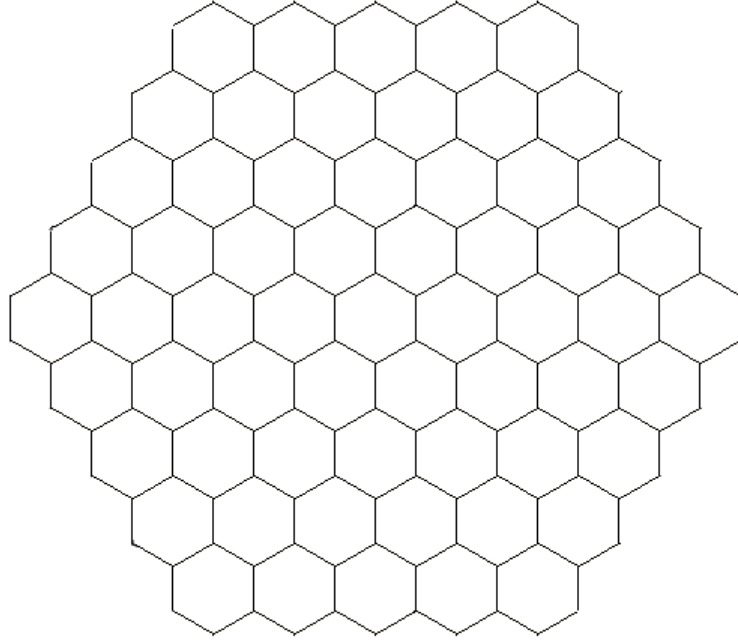
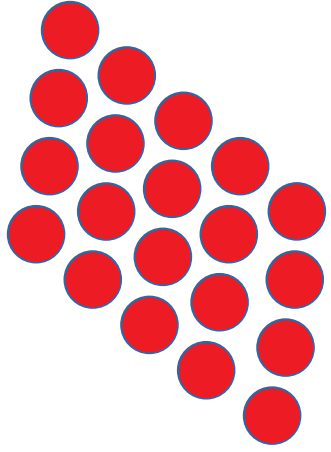
**723x1153   81533x121   3533x3533   22157x35**

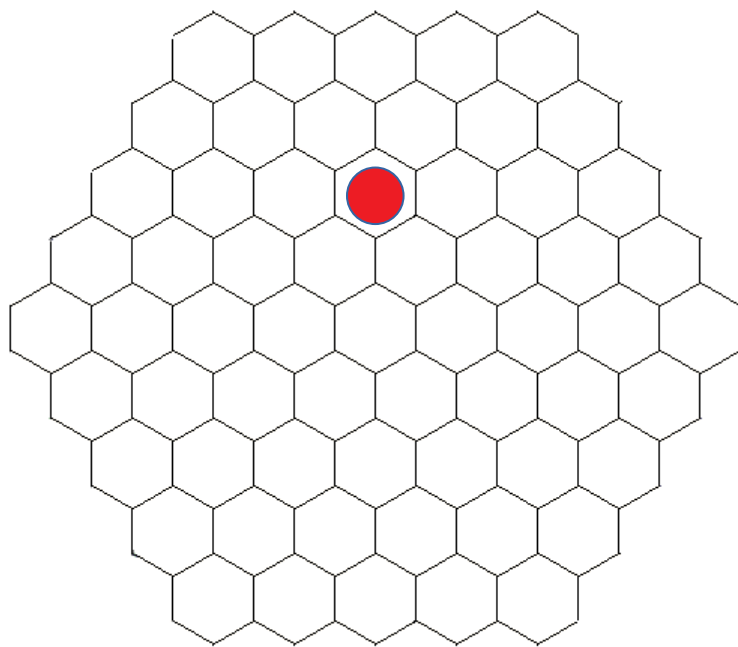
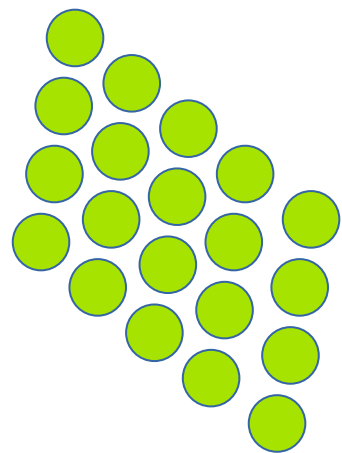
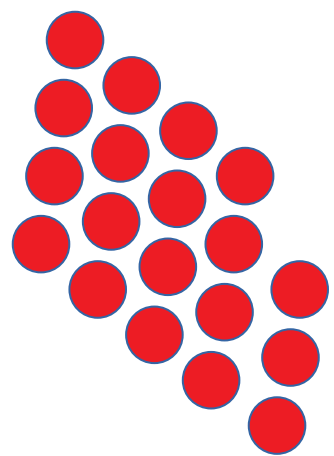


# Produto

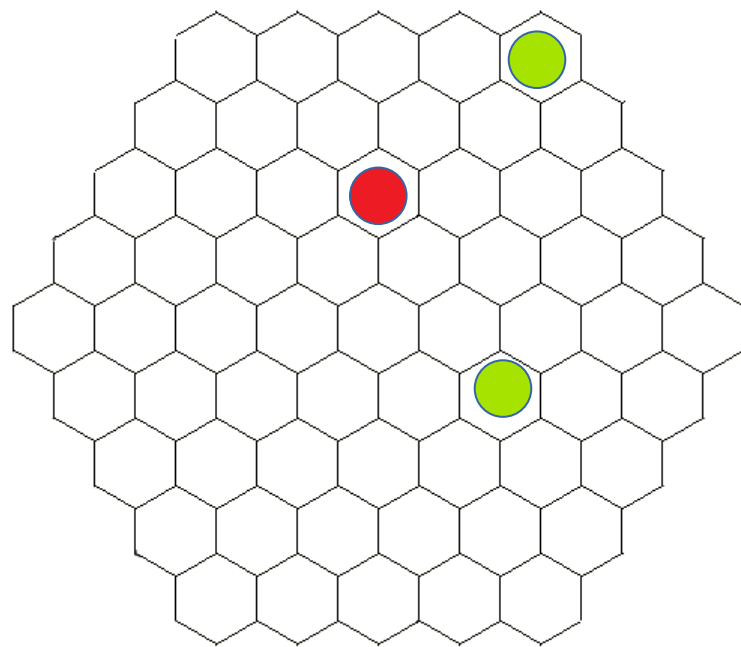
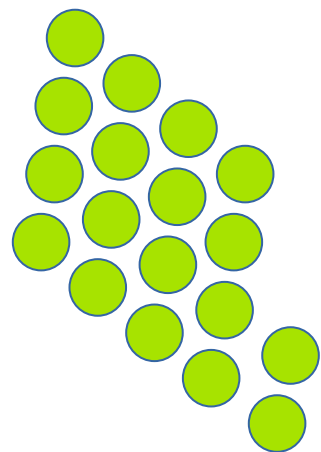
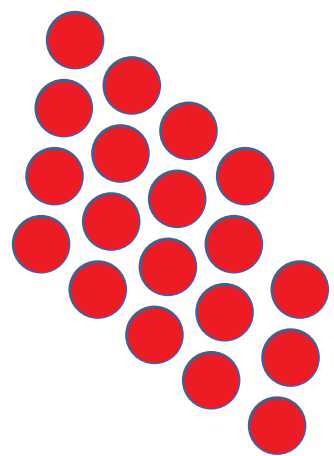


- Two players, **Red** and **Green**, alternate placing tokens;
- The first player can only play one token, then each must play two pieces;
- After the first play the pie rule applies;
- Both players can play any combination of coloured tokens;
- The game ends once the board is filled;
- The victor is who scores the larger product of his colours biggest groups;
- In case of draw the one with fewer pieces on the board wins.





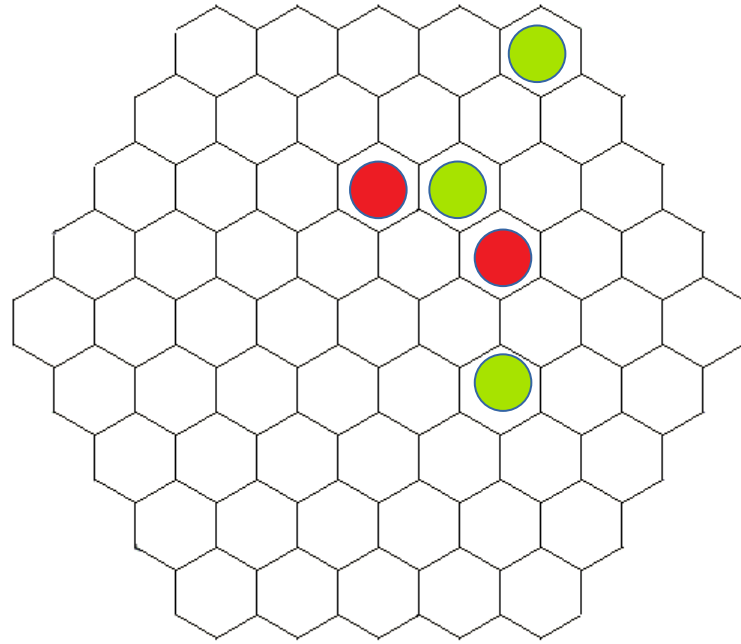
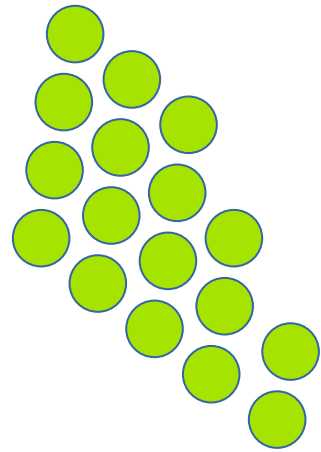
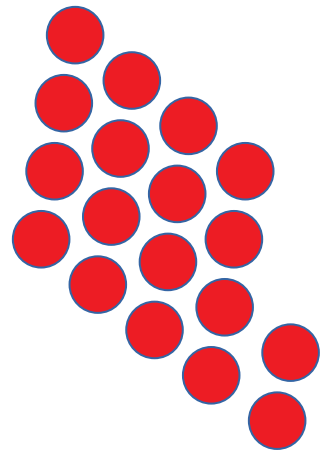
Red



Green

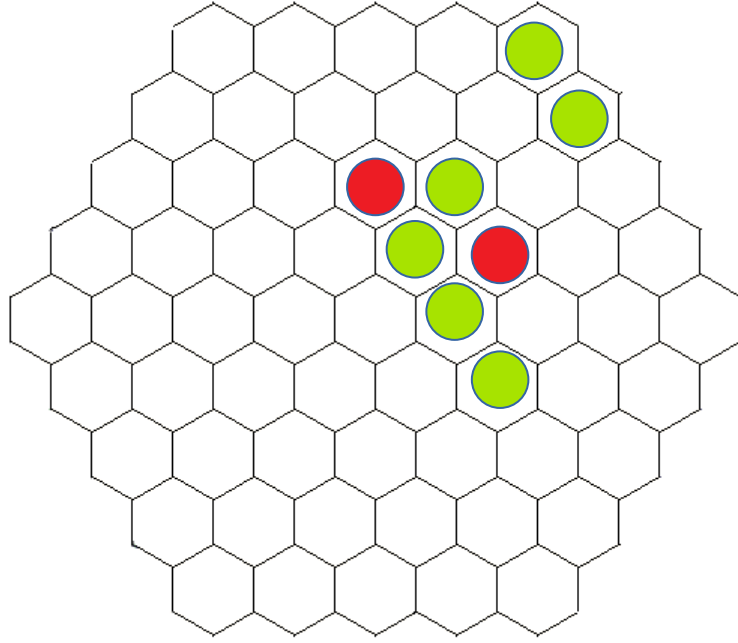
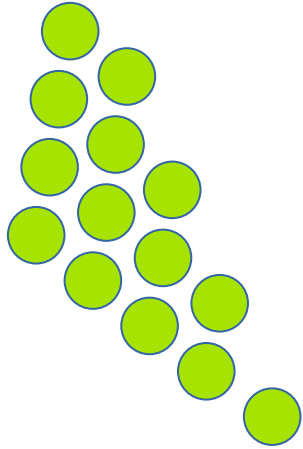
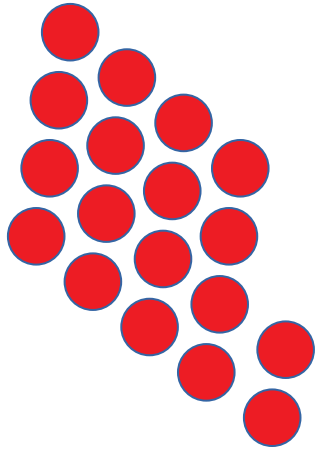
$$1 \times 1 = 1$$





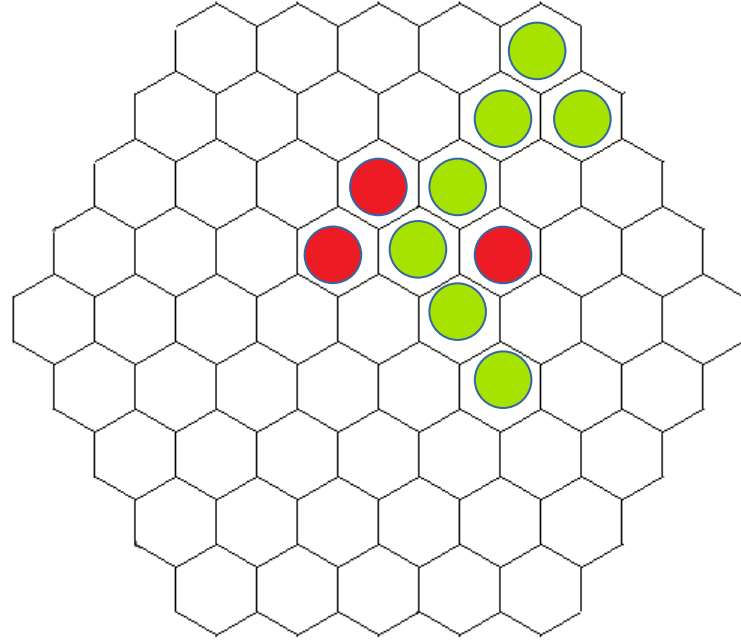
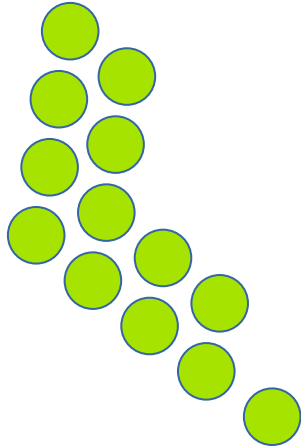
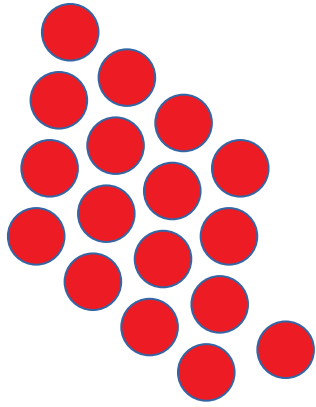
Red

$$1 \times 1 = 1$$



Green

$$4 \times 2 = 8$$



Red

$$2 \times 1 = 8$$

Green

$$7 \times 0 = 0$$

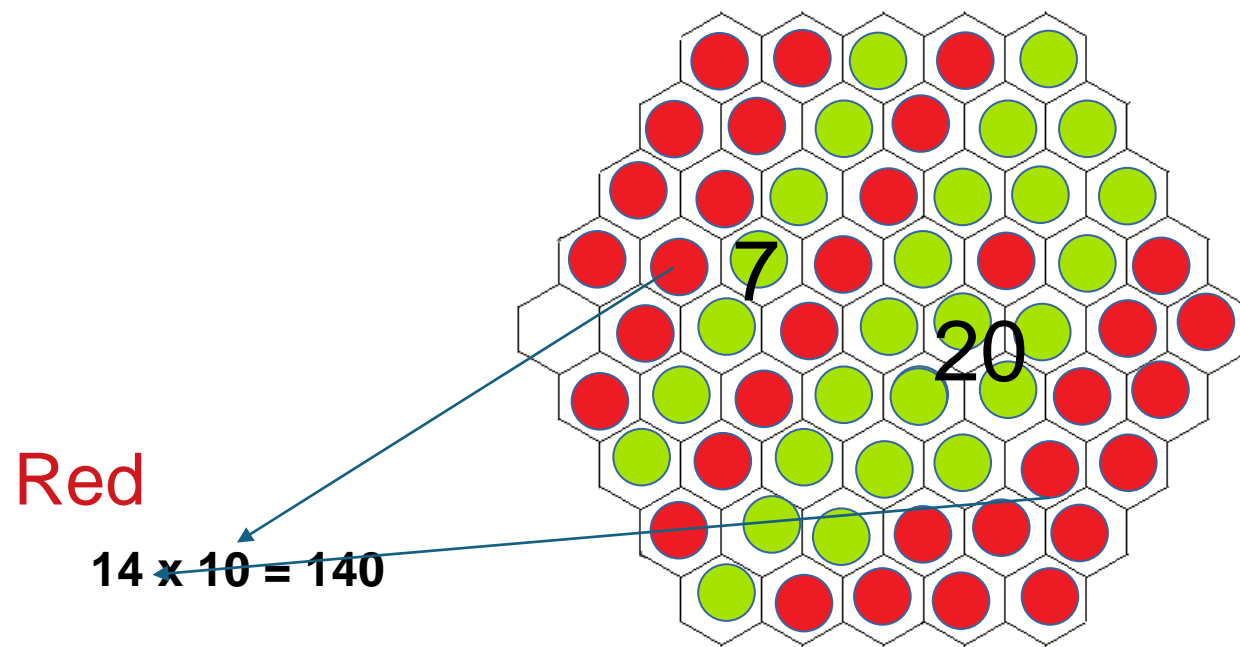
**ETC.**



Green

Red to play and win

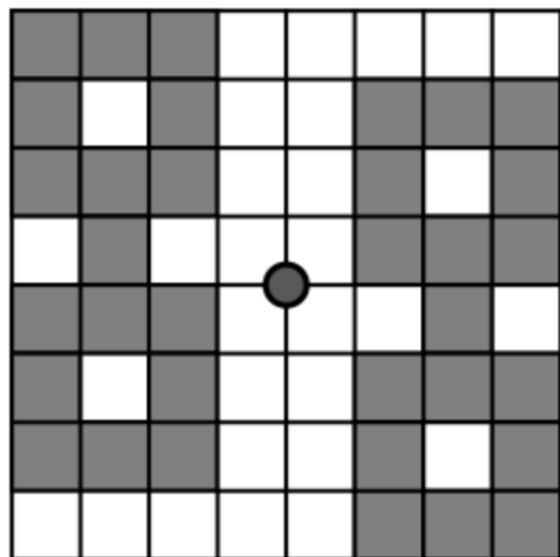
$$x = 140$$



Red

$$14 \times 10 = 140$$

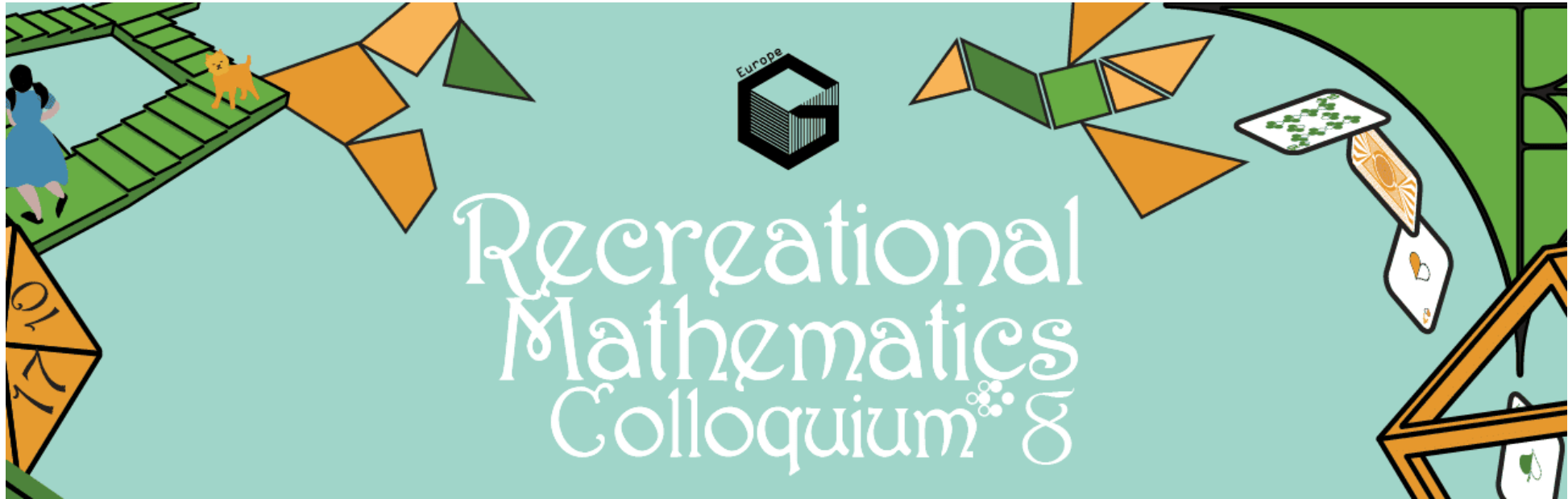
$$\underline{13 \times 11 = 143}$$



Erasmus+  
2019-1-PT01-KA201-061414



# Recreational Mathematics Colloquium 8



**Recreational Mathematics Colloquium 8 | Gathering for Gardner Europe**

Lisbon, Portugal

January 26 (general public) and 27 to 29, 2025