



Teachers' Book

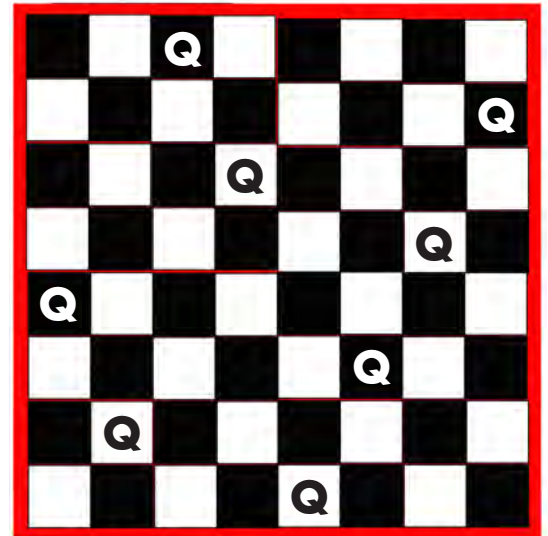
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Solutions

8 Queens

Here is one possible solution.
However, there may be others.



Abracadabra

There are 1,024 ways of reading 'Abracadabra'.

Whichever route is followed, there are just 2 choices at each step. There is 1 way to get to the first A, 2 ways to reach the first B, 4 ways to reach R, 8 ways to reach the second A, and so on. There are 10 steps after the first A to the final A.

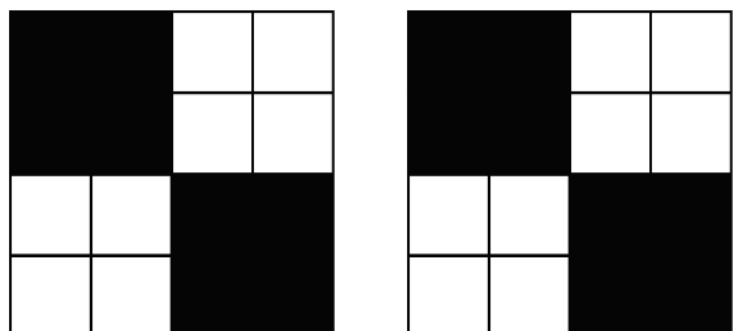
The solution is, therefore:

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1,024$$

It also forms the sequence: 2, 4, 8, 16, 32, 64, 128, 256, 1,024...

Black and White Squares

Here are two possible solutions.
However, there may be others.



Solutions

Chessboard Squares

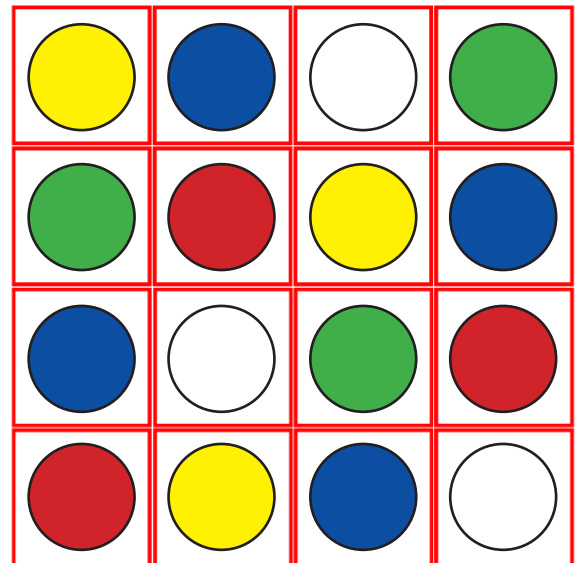
There is a total of 204.

The total number of different squares on a matrix with n units on a side is the sum of the squares of the first n integers.

1 square unit of 64
 4 square units of 49
 9 square units of 36
 16 square units of 25
 25 square units of 16
 36 square units of 9
 49 square units of 4
 64 square units of 1

Colour Squares

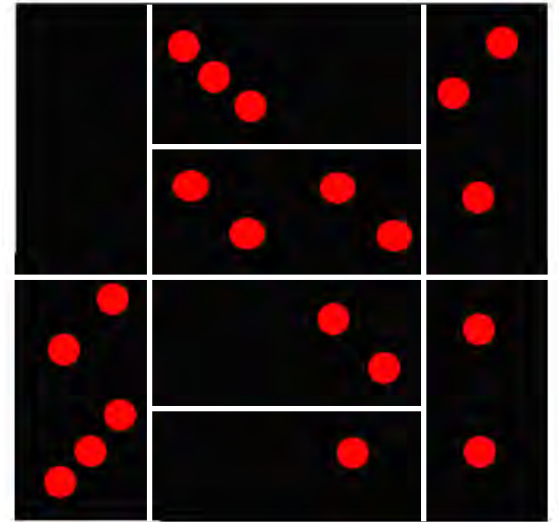
This is a variation of a common puzzle, similar to Sudoku. It can be a deceptively difficult puzzle. The important mathematical element is that it encourages the player to constantly check their solutions and to 'guess' the impact of changing their counter positions.



Solutions

Domino Magic Square

Here is one possible solution.
However, there may be others.



Fibonacci Square

The solution is 63.

The solution is the sum of the preceding touching squares.

1	1	1	1
1	3	5	7
1	5	13	25
1	7	25	63

Solutions

Trouble at the Library

There are 3,628,800 ways to arrange 10 books on the shelf.

1 book: $1 \times 1 = 1$
 2 books: $2 \times 1 = 2$
 3 books: $3 \times 2 = 6$
 4 books: $4 \times 6 = 24$
 5 books: $5 \times 24 = 120$
 6 books: $6 \times 120 = 720$
 7 books: $7 \times 720 = 5,040$
 8 books: $8 \times 5,040 = 40,320$
 9 books: $9 \times 40,320 = 362,880$
 10 books: $10 \times 362,880 = 3,628,800$

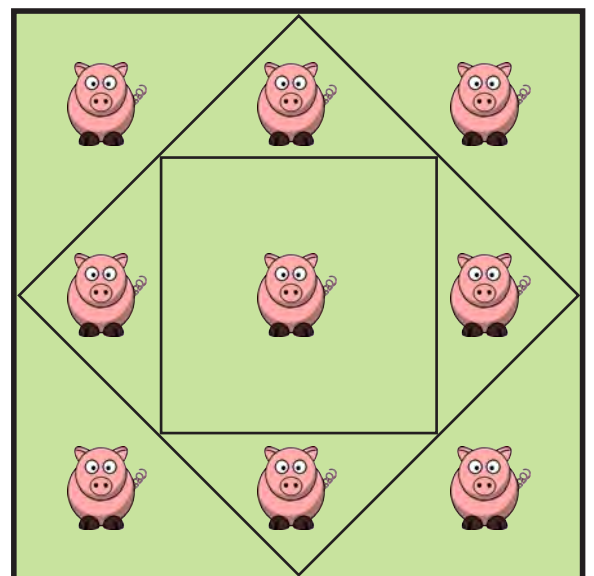
Nines

Here is one possible solution.
 However, there may be others.

$$99 + 99/99 = 100$$

Pig Pen Puzzle

Here is one possible solution.
 However, there may be others.



Solutions

Spiral Area

The red area occupies one quarter of the total area.

This activity is designed to encourage children to translate complex shapes into simple ones, and to develop their visualisation skills.

Triangles

There are 27 triangles.

In general, the number of triangles in a triangular grid follows the sequence:
1, 5, 13, 27, 48...

Square Route

This puzzle is similar to a maze. In finding a solution the player may begin by just trying a few ideas, possibly treating each square separately. A possible solution may become evident when the player sees a pattern of triangles instead of a pattern of squares.



Curriculum Links

Links with the Skills Framework

Developing Thinking

Plan

- Asking questions.
- Activating prior skills, knowledge and understanding.
- Gathering information.
- Determining the process/method and strategy.
- Determining success criteria.

Develop

- Generating and developing ideas.
- Valuing errors and unexpected outcomes.
- Entrepreneurial thinking.
- Thinking about cause and effect and making inferences.
- Thinking logically and seeking patterns.
- Considering evidence, information and ideas.
- Forming opinions and making decisions.
- Monitoring progress.

Reflect

- Reviewing outcomes and success criteria.
- Reviewing the process/method.
- Evaluate own learning and thinking.
- Linking and lateral thinking.

Developing ICT

ICT Skills Framework

- Finding and developing information and ideas.
- Creating and presenting information and ideas.

Developing Communication

Oracy

- Developing information and ideas.
- Presenting information and ideas.

Reading

- Locating, selecting and using information.
- Using reading strategies.
- Responding to what has been read.

Writing

- Organising ideas and information.
- Writing accurately.

Wider Communication Skills

- Communicating ideas and emotions.
- Communicating information.

Developing Number

Use Mathematical Information

- Using numbers.
- Measuring.
- Gathering information.

Calculate

- Using the number system.
- Using a variety of methods.

Interpret and Present Findings

- Talking about and explaining work.
- Comparing data.
- Recording and interpreting data and presenting findings.

Key

- Main focus
- No intended focus
- Incidental focus