

GCSE Maths: Patterns and diagrams (Higher): worksheet

GCSE Maths - Sequences and nth Term - Higher - Lesson 11.2

Name: _____

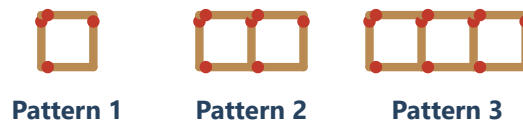
Date: _____

Score: _____

14 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch11-sequences/higher/patterns-and-diagrams/

Exercise 11B Patterns and diagrams Non-calculator

1 Here are the first three patterns made from matchsticks.



(a) How many matchsticks are needed for pattern 4?

Answer: _____

(b) How many matchsticks are needed for pattern 5?

Answer: _____

(c) How many matchsticks are needed for pattern 8?

Answer: _____

2 Here are the first three patterns made from matchsticks.



(a) How many matchsticks are needed for pattern 4?

Answer: _____

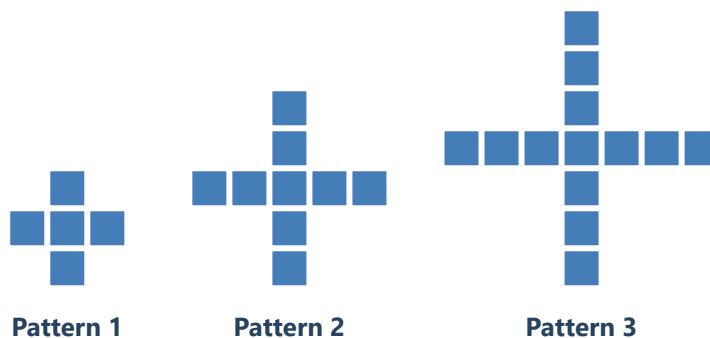
(b) How many matchsticks are needed for pattern 5?

Answer: _____

(c) How many matchsticks are needed for pattern 9?

Answer: _____

3 Here are the first three tile patterns.



(a) How many tiles are needed for pattern 4?

Answer:

(b) How many tiles are needed for pattern 5?

Answer:

(c) How many tiles are needed for pattern 7?

Answer:

4 Here are the first three patterns made from matchsticks.



(a) How many matchsticks are needed for pattern 4?

Answer:

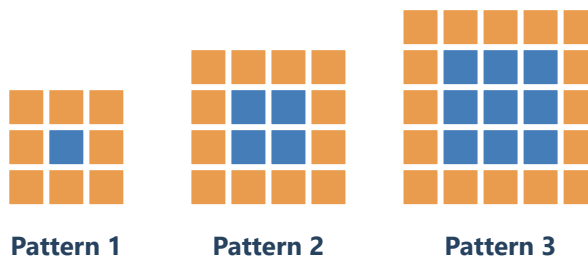
(b) How many matchsticks are needed for pattern 6?

Answer:

(c) How many matchsticks are needed for pattern 8?

Answer:

5 A path is made of blue tiles in the middle with orange tiles around the border. Here are the first three patterns.



(a) How many **orange** tiles are needed for pattern 4?

Answer:

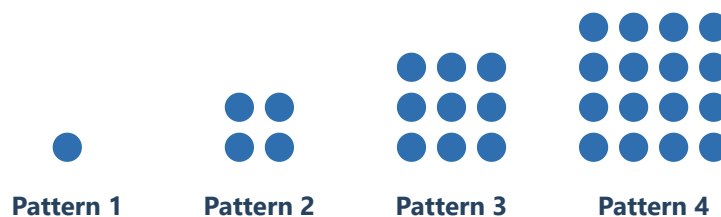
(b) How many **orange** tiles are needed for pattern 6?

Answer:

(c) How many **orange** tiles are needed for pattern 10?

Answer:

6 Here are the first four patterns of dots.



(a) How many dots are in pattern 5?

Answer:

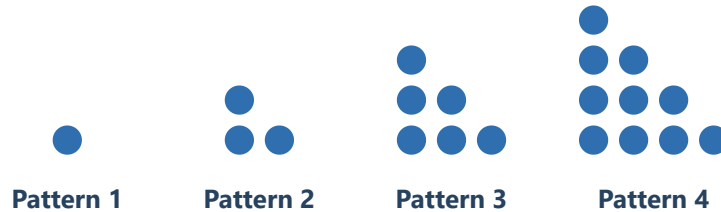
(b) How many dots are in pattern 6?

Answer:

(c) How many dots are in pattern 8?

Answer:

7 Here are the first four patterns of dots.



(a) How many dots are in pattern 5?

Answer:

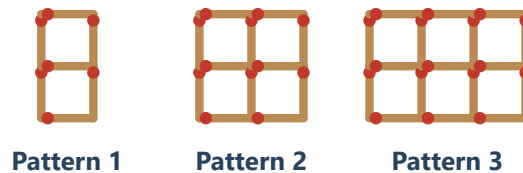
(b) How many dots are in pattern 6?

Answer:

(c) How many dots are in pattern 8?

Answer:

8 Here are the first three patterns of squares made with matchsticks.



(a) How many matchsticks are needed for pattern 4?

Answer:

(b) How many matchsticks are needed for pattern 5?

Answer:

(c) How many matchsticks are needed for pattern 7?

Answer:

9 For each pattern of squares or triangles, is there a pattern that uses exactly the number of matchsticks given?

(a) The squares pattern (4, 7, 10, ...): exactly 31 matchsticks

Answer:

(b) The squares pattern (4, 7, 10, ...): exactly 40 matchsticks

Answer:

(c) The squares pattern (4, 7, 10, ...): exactly 50 matchsticks

Answer:

(d) The triangles pattern (3, 5, 7, ...): exactly 21 matchsticks

Answer:

(e) The triangles pattern (3, 5, 7, ...): exactly 30 matchsticks

Answer:

- 10** Tables at a school party are pushed together in a long row. One table seats 6 people, two tables seat 10 people, three tables seat 14 people, and so on. How many people can sit at a row of 8 tables?

Answer:

- 11** Rob says, "Pattern 1 of the square matchstick pattern uses 4 matchsticks, so pattern 10 uses $10 \times 4 = 40$." Is Rob right? Explain.

Answer:

- 12** A pattern uses 4, 9, 14, 19 matchsticks for patterns 1 to 4. Mia says there is a pattern that uses exactly 100 matchsticks. Is Mia right? Give a reason.

Answer:

- 13** In the dot patterns that give the triangular numbers (1, 3, 6, 10, ...), pattern 6 has 21 dots. How many **more** dots are needed to change pattern 6 into pattern 7? Explain how you know without counting all the dots.

Answer:

- 14** Sam makes a row of 9 squares from matchsticks (as in the pattern above). Tara makes a row of 9 triangles from matchsticks. Who uses more matchsticks, and how many more?

Answer: