

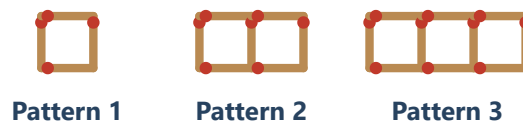
GCSE Maths: Patterns and diagrams (Foundation): answers

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

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch11-sequences/foundation/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: 13

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

Answer: 16

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

Answer: 25

2 Here are the first three patterns made from matchsticks.



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

Answer: 9

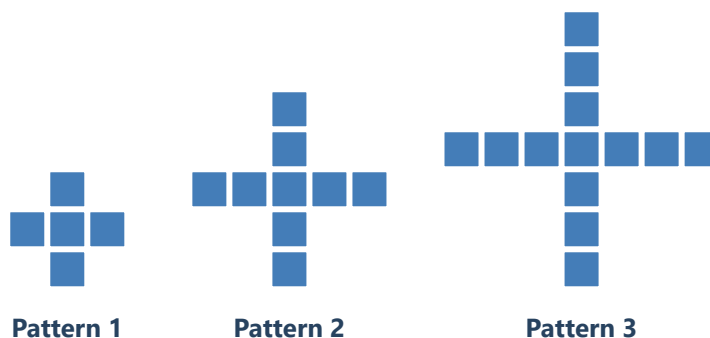
(b) How many matchsticks are needed for pattern 5?

Answer: 11

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

Answer: 19

3 Here are the first three tile patterns.



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

Answer: 17

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

Answer: 21

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

Answer: 29

4 Write the two missing numbers in each sequence of counts for patterns 1 to 5.

- (a) Squares pattern: 4, 7, 10, ?, ?

Answer: 13, 16

- (b) Hexagons pattern: 6, 11, 16, ?, ?

Answer: 21, 26

5 Here are the first three patterns made from matchsticks.



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

Answer: 21

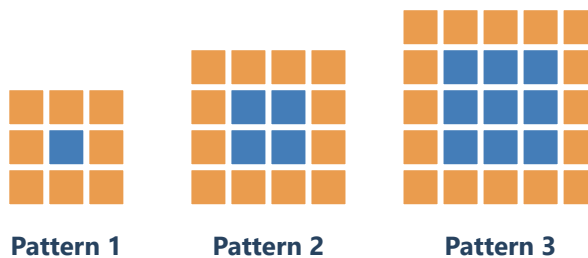
- (b) How many matchsticks are needed for pattern 6?

Answer: 31

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

Answer: 41

6 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: 20

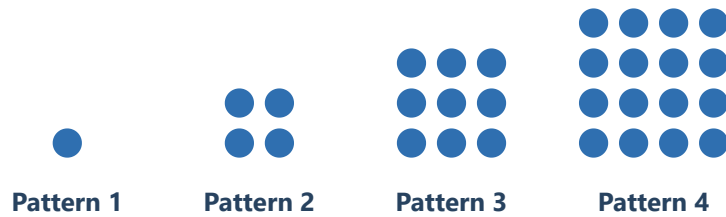
- (b) How many **orange** tiles are needed for pattern 6?

Answer: 28

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

Answer: 44

7 Here are the first four patterns of dots.



(a) How many dots are in pattern 5?

Answer: 25

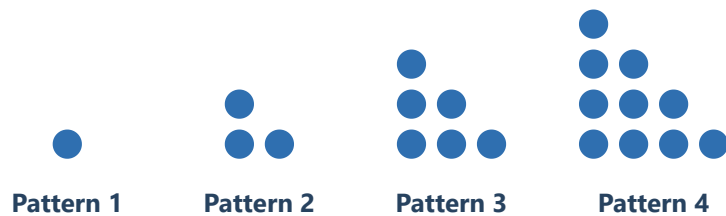
(b) How many dots are in pattern 6?

Answer: 36

(c) How many dots are in pattern 8?

Answer: 64

8 Here are the first four patterns of dots.



(a) How many dots are in pattern 5?

Answer: 15

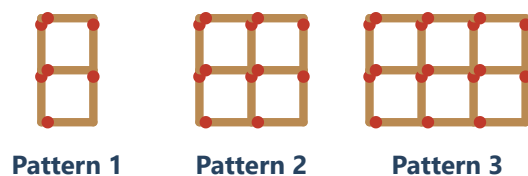
(b) How many dots are in pattern 6?

Answer: 21

(c) How many dots are in pattern 8?

Answer: 36

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



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

Answer: 22

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

Answer: 27

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

Answer: 37

- 10** 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: Yes, pattern 10
 - (b) The squares pattern (4, 7, 10, ...): exactly 40 matchsticks
Answer: Yes, pattern 13
 - (c) The squares pattern (4, 7, 10, ...): exactly 50 matchsticks
Answer: No
 - (d) The triangles pattern (3, 5, 7, ...): exactly 21 matchsticks
Answer: Yes, pattern 10
 - (e) The triangles pattern (3, 5, 7, ...): exactly 30 matchsticks
Answer: No
- 11** 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: 34 people
- 12** 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: No. Pattern 10 uses 31 matchsticks.
- 13** 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: No. Every number in the sequence ends in 4 or 9, and 100 ends in 0.
- 14** 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: 7 more dots
- 15** 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: Sam uses 9 more matchsticks (28 compared with 19)