

## Sequences: Patterns

Video 290 on [www.corbettmaths.com](http://www.corbettmaths.com)

Examples



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Workout

Question 1: These patterns are made from sticks

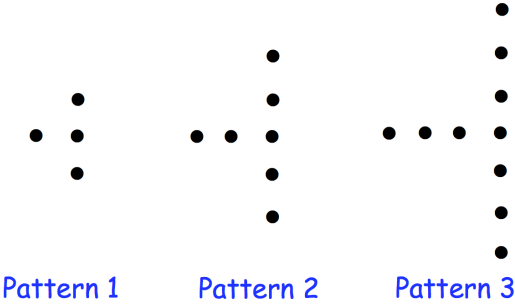


- (a) Draw pattern 4
- (b) Draw pattern 5
- (c) How many sticks will there be in pattern 6?
- (d) How many sticks will there be in pattern 10?
- (e) Which pattern will use 31 sticks?

Theo says that he has made a pattern with exactly 100 sticks.

- (f) Explain why Theo must be wrong.

Question 2: Here are some patterns of dots



- (a) Continue the pattern to show pattern 4
- (b) How many dots will there be in pattern 6?
- (c) Which pattern will use 28 dots?
- (d) Which pattern will use 43 dots?

Pattern 800 has 2401 dots.

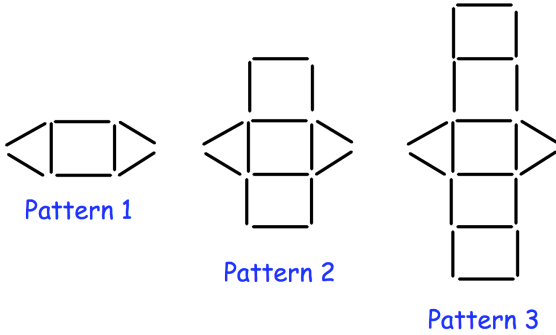
- (e) How many dots will pattern 801 have?
- (f) How many dots will pattern 799 have?

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Question 3: The patterns below are made from sticks

(a) Complete the table for pattern 4.



Pattern Number	1	2	3	4
Number of Sticks	8	14	20	

(b) Sketch pattern 5.

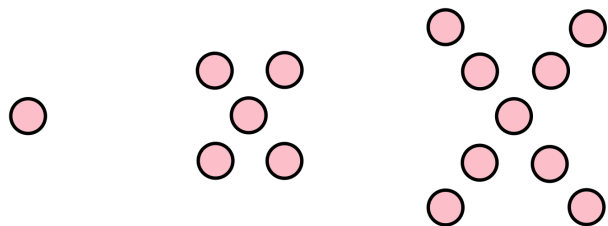
Here is a rule for working out the number of sticks

Multiply pattern number by 6 and add 2

- (c) How many sticks will be in pattern 30?
- (d) How many sticks will be in pattern 120?
- (e) Which pattern will have 80 sticks?
- (f) Which pattern will have 482 sticks?

Question 4: The diagram shows a sequence of patterns

(a) Draw pattern 4.



(b) Work out the number of circles in pattern 5.

Pattern 1
Pattern 2
Pattern 3

(c) Write down a rule for continuing the patterns.

(d) Explain why you **cannot** make a pattern with exactly 66 circles.

(e) Complete this rule

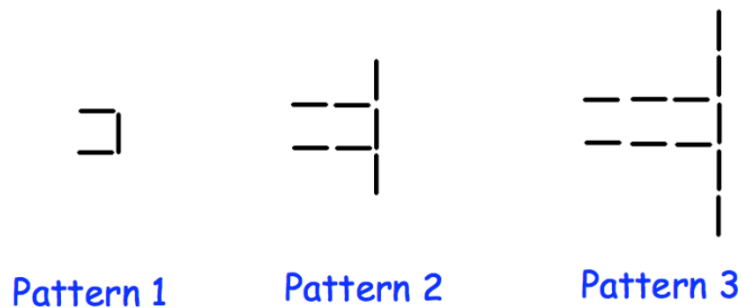
Number of circles = Pattern number ×  -

Question 5: The patterns below are made from sticks.



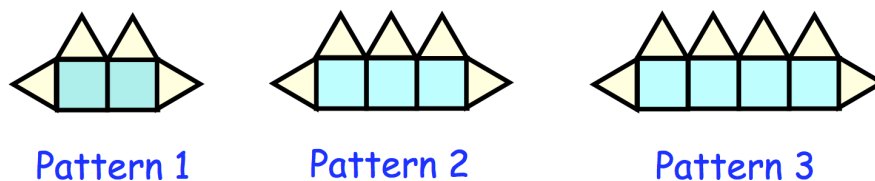
- Write an expression, in terms of  $n$ , for the number of sticks in pattern  $n$
- How many sticks will there be in pattern 55?
- Which pattern number will use exactly 100 sticks?

Question 6: These patterns are made from sticks.



- Write an expression, in terms of  $n$ , for the number of sticks in pattern  $n$
- How many sticks will there be in pattern 220?
- Which pattern number will use exactly 139 sticks?

Question 7: The patterns below are made from squares and triangles.



- How many triangles are there in pattern 6?
- How many squares are there in pattern 7?
- Write an expression, in terms of  $n$ , for the number of squares in pattern  $n$
- Write an expression, in terms of  $n$ , for the number of triangles in pattern  $n$

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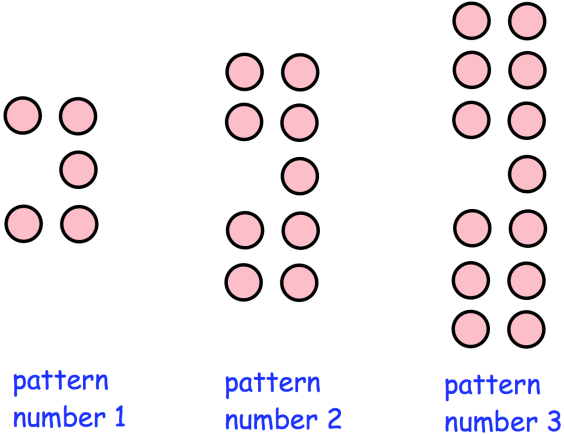
## Apply

Question 1: Here is a pattern made with circular discs.

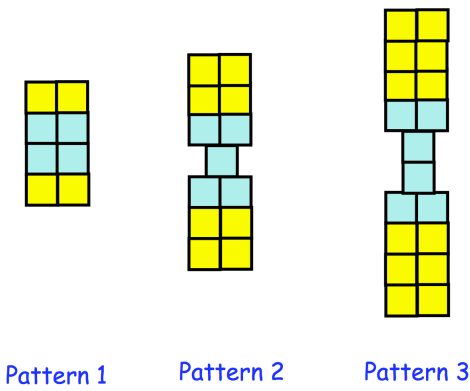
(a) Find an expression, in terms of  $n$ , for the number of discs in pattern number  $n$ .

Olivia has 103 discs.

(b) Can Olivia make a pattern in this sequence using exactly 103 discs?  
Explain your answer.



Question 2: Here is a pattern of blue and yellow squares.



Which statements below are true?

- A** Pattern 5 has 9 blue squares
- B** The number of yellow squares is always even
- C** Pattern 10 has 50 squares in total
- D** Every pattern has more yellow than blue squares
- E** Pattern 7 has 28 yellow squares
- F** The number of blue squares in Pattern 16 is a prime number

## Answers



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