

GCSE Maths: Sequences in context, reasoning and proof (Higher): worksheet

GCSE Maths - Sequences and nth Term - Higher - Lesson 11.9

Name: _____

Date: _____

Score: _____

13 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch11-sequences/higher/sequences-in-context-reasoning-and-proof/

Exercise 111 Sequences in context and reasoning Non-calculator

- 1 Rhys earns £2150 a month in year 1 at a company, £2300 a month in year 2, £2450 a month in year 3, and so on (a £150 rise each year). Find the n th term and his monthly pay in year 10.

Answer: _____

- 2 A tank holds 500 litres. Water drains out at 20 litres every minute. Term 1 is 500 (the start), term 2 is 480 (after 1 minute), term 3 is 460, and so on. After how many minutes is the tank empty?

Answer: _____

- 3 Sequence A is 4, 7, 10, 13, ... and sequence B is 30, 28, 26, 24, ... In which position does A first have a bigger term than B? Show your working.

Answer: _____

- 4 A stack of identical chairs is 90 cm high with one chair. Each extra chair adds 8 cm, so a stack of n chairs is $(8n + 82)$ cm high. The roof of a van is 300 cm high. What is the height of the tallest stack that will fit, and how many chairs is that?

Answer: _____

- 5 A theatre has 14 seats in the first row, 16 in the second row, 18 in the third row, and so on. The number of seats in row n is $2n + 12$.

- (a) How many seats are in row 20?

Answer: _____

- (b) A row has 40 seats. Which row is it?

Answer: _____

- 6 A video gets 5 views on day 1, 15 on day 2 and 45 on day 3. The number of views triples each day. How many views does it get on day 5?

Answer: _____

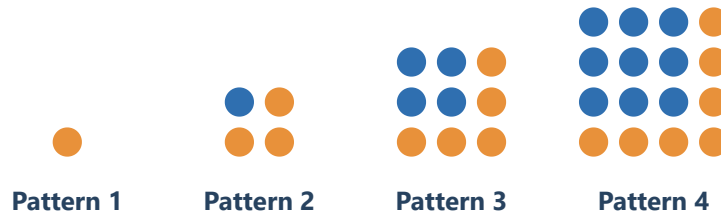
- 7 Show that every term of the sequence with n th term $6n + 3$ is a multiple of 3.

Answer: _____

- 8 Mia says the n th term of 10, 7, 4, 1, ... is $3n + 7$. What mistake has she made? Find the correct n th term.

Answer: _____

- 9 Each pattern in the picture is a square of dots. The orange dots show the new dots added to make each square. Explain why the number of orange dots in pattern n is $2n - 1$, and use this to explain why $1 + 3 + 5 + 7 = 4^2$.



Answer:

- 10** Fill in the table for each description and say whether the sequence is arithmetic, geometric or quadratic.

(a) The n th term is $5n + 1$

Answer:

(b) The n th term is 3×2^n

Answer:

(c) The n th term is $n^2 + 1$

Answer:

- 11** The 4th term of an arithmetic sequence is 17 and the 10th term is 41. Find the n th term and the first term.

Answer:

- 12** Hire company A charges £20 plus £8 per day, so n days cost $8n + 20$ pounds. Company B charges £5 plus £11 per day, so n days cost $11n + 5$. After how many days do the two companies charge the same? Which is cheaper for 10 days?

Answer:

- 13** The n th term of a sequence is 2^n . Show that each term is double the previous term.

Answer: