GCSE Exam Questions

Nth Term of a Sequence | Algebra

GCSE Exam Questions: Nth Term of a Sequence

1) Joe has written out an arithmetic sequence for how much he earned per hour over a 5 hour shift last night at a restaurant: £17.87, £27.24, £36.61, £45.98, £55.35.

(a) How much money does Joe earn per hour?

- -

(1)

(b) Joe added the tips he received at the beginning of this sequence. Write the *n*th term of the sequence in the form *an + b*, where *a* and *b* are correct to 2 decimal places

- -

(2)

(3 marks)

2) **(a)** A gardener wants to install a fence in a field. The table below describes the number of vertical and horizontal posts that are required to build a 5*m* fence.

State the number of horizontal fence posts needed for a fence that is 6*m* long.

Length of Fence (*m*)	1	2	3	4	5
Number of Vertical Posts	2	3	4	5	6
Number of Horizontal Posts	3	6	9	12	15
Total Number of Posts	5	9	13	17	21

- -

(1)

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(b) Find the nth term for the total number of fence posts required for a field of length n.

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(2)

(c) How many fence posts would the gardener need in total to build a fence that is 12m long?

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(1)

(4 marks)

3) A car depreciates in value by £500 every year after it is bought.
The car is bought for £7,000.

State the value of the car at the end of n years.

(2 marks)

4) (a) At a driving range, the number of golf balls that can be dispensed from the machine follows an arithmetic sequence. It costs £1 for every 25 golf balls. On one day, the machine accidentally dispensed 5 extra balls for the first £1 in the machine.

Complete the table to show the number of golf balls the first member can dispense from the machine.

Cost (£s)	1	2	3	4	5
Number of Golf Balls					

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(1)

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(b) How many golf balls would the same member dispense if he paid £10 into the machine?

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(2)

(c) The next member dispenses 230 golf balls from the machine. How much money is he charged?

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(2)

(5 marks)

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5) (a) In a traditional mill, a water wheel drives a runnerstone to grind flour. For each turn of the water wheel, the runnerstone revolves $2\frac{1}{4}$ times.

Generate the sequence to show the number of turns of the runnerstone for each turn of the water wheel.

Number of Revolutions of the Water Wheel	1	2	3	4	5
Number of Revolutions of the Runnerstone					

(2)

(b) Write the nth term for the sequence in the form $\frac{a}{b}n$ where a and b are integers.

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(2)

(c) The water wheel takes 200 litres of water during each revolution. How much water is needed for the runnerstone to revolve 45 times? State the units in your answer.

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(2)

(6 marks)

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GCSE Exam Questions: Nth Term of a Sequence Answers

	Question	Answer	Marks
1)	Joe has written out an arithmetic sequence for how much he earned per hour over a 5 hour shift last night at a restaurant: £17.87, £27.24, £36.61, £45.98, £55.35.		
(a)	How much money does Joe earn per hour?	£9.37	**(1)**
(b)	Joe added the tips he received at the beginning of this sequence. Write the nth term of the sequence in the form an+b, where a and b are correct to 2 decimal places.	$9.37n \pm 8.5$ $9.37n + 8.50$	**(1)** **(1)**
2)	A gardener wants to install a fence in a field. The table below describes the number of vertical and horizontal posts that are required to build a 5*m* fence. 	Length of Fence (*m*)	1	2	3	4	5
Number of Vertical Posts	2	3	4	5	6
Number of Horizontal Posts	3	6	9	12	15
Total Number of Posts	5	9	13	17	21 | State the number of horizontal fence posts needed for a fence that is 6*m* long.	18	**(1)**
(b)	Find the nth term for the total number of fence posts required for a field of length *n*.	$4n \pm 1$ $4n + 1$	**(1)** **(1)**
(c)	How many fence posts would the gardener need in total to build a fence that is 12*m* long?	$4 \times 12 + 1 = 49$	**(1)**
3)	A car depreciates in value by £500 every year after it is bought. The car is bought for £7,000. State the value of the car at the end of *n* years.	$-500n$ $7000 - 500n$	**(1)** **(1)**

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GCSE Exam Questions: Nth Term of a Sequence Answers

	Question	Answer	Marks
4) **(a)**	At a driving range, the number of golf balls that can be dispensed from the machine follows an arithmetic sequence. It costs £1 for every 25 golf ball. On one day, the machine accidentally dispensed 5 extra balls for the first £1 in the machine. Complete the table to show the number of golf balls the first member can dispense from the machine. <table><tr><td>Cost (£s)</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of Golf Balls</td><td></td><td></td><td></td><td></td><td></td></tr></table>	30, 55, 80, 105, 130	**(1)**
(b)	How many golf balls would the same member dispense if he paid £10 into the machine?	$25 \times 10 + 5$ $= 255$	**(1)** **(1)**
(c)	The next member dispenses 230 golf balls from the machine. How much money is he charged?	$\dfrac{230 - 5}{25}$ $= 9$	**(1)** **(1)**
5) (a)	In a traditional mill, a water wheel drives a runnerstone to grind flour. For each turn of the water wheel, the runnerstone revolves $2\frac{1}{4}$ times. Generate the sequence to show the number of turns of the runnerstone for each turn of the water wheel. <table><tr><td>Number of Revolutions of the water wheel</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of Revolutions of the runnerstone</td><td></td><td></td><td></td><td></td><td></td></tr></table>	$2\frac{1}{4}, 4\frac{1}{2}, 6\frac{3}{4}, 9, 11\frac{1}{4}$ Minimum 4 correct All 5 correct	 **(1)** **(1)**
(b)	Write the nth term for the sequence in the form $\frac{a}{b} n$ where a and b are integers.	$2\frac{1}{4} = \dfrac{9}{4}$ $\dfrac{9}{4} n$	**(1)** **(1)**
(c)	The water wheel takes 200 litres of water during each revolution. How much water is needed for the runnerstone to revolve 45 times? State the units in your answer.	$45 \div \dfrac{9}{4} = 20$ $20 \times 200 = 4000L$	**(1)** **(1)**

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