



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Sequences · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Sequences

Total marks available: 118

● Sequences

✓ -119

Q1 · ● Developing · 3 marks

METHOD

$$-4 \times 27 - 11 = -119$$

✓ $9n + 2$

Q2 · ● Developing · 3 marks

METHOD

Common difference = 9

$$n\text{th term} = 9n + 2$$

✓ -234

Q3 · ● Developing · 3 marks

METHOD

$$-9 \times 28 + 18 = -234$$

✓ $9n + 11$

Q4 · ● Developing · 3 marks

METHOD

Common difference = 9

$$n\text{th term} = 9n + 11$$

✓ -106

Q5 · ● Developing · 3 marks

METHOD

$$-5 \times 19 - 11 = -106$$

✓ $8n - 19$

Q6 · ● Developing · 3 marks

METHOD

Common difference = 8

nth term = $8n - 19$

✓ $2n + 2$

Q7 · ● Developing · 3 marks

METHOD

Common difference = 2

nth term = $2n + 2$

✓ 73

Q8 · ● Developing · 3 marks

METHOD

$3 \times 29 - 14 = 73$

✓ $5n + 19$

Q9 · ● Developing · 3 marks

METHOD

Common difference = 5

nth term = $5n + 19$

✓ $9n - 8$

Q10 · ● Developing · 3 marks

METHOD

Common difference = 9

nth term = $9n - 8$

✓ $n^2 - 3n - 7$

Q11 · ● Secure · 5 marks

METHOD

First differences: 0, 2, 4

Second difference = 2, so $a = 2 \div 2 = 1$

n th term = $n^2 - 3n - 7$

✓ $-2n^2 + n - 3$

Q12 · ● Secure · 5 marks

METHOD

First differences: -5, -9, -13

Second difference = -4, so $a = -4 \div 2 = -2$

n th term = $-2n^2 + n - 3$

✓ -317

Q13 · ● Secure · 3 marks

METHOD

$(-1) \times 19^2 + 38 + 6 = -317$

✓ $2n^2 + 5n + 3$

Q14 · ● Secure · 5 marks

METHOD

First differences: 11, 15, 19

Second difference = 4, so $a = 4 \div 2 = 2$

n th term = $2n^2 + 5n + 3$

✓ 1808

Q15 · ● Secure · 3 marks

METHOD

$(3) \times 25^2 - 75 + 8 = 1808$

✓ $-n^2 - n - 8$

Q16 · ● Secure · 5 marks

METHOD

First differences: $-4, -6, -8$

Second difference = -2 , so $a = -2 \div 2 = -1$

n th term = $-n^2 - n - 8$

✓ $-2n^2 + 5n - 3$

Q17 · ● Secure · 5 marks

METHOD

First differences: $-1, -5, -9$

Second difference = -4 , so $a = -4 \div 2 = -2$

n th term = $-2n^2 + 5n - 3$

✓ $-2n^2 - 6n + 2$

Q18 · ● Secure · 5 marks

METHOD

First differences: $-12, -16, -20$

Second difference = -4 , so $a = -4 \div 2 = -2$

n th term = $-2n^2 - 6n + 2$

✓ -1172

Q19 · ● Secure · 3 marks

METHOD

$(-2) \times 23^2 - 115 + 1 = -1172$

✓ -756

Q20 · ● Secure · 3 marks

METHOD

$(-2) \times 18^2 - 108 = -756$

✓ Yes ($n = 5$)

Q21 · ● Greater Depth · 5 marks

METHOD

$n^2 - 3n = 10$ when $n = 5$, a positive whole number

✓ Yes ($n = 4$)

Q22 · ● Greater Depth · 5 marks

METHOD

$3n^2 + 6n + 9 = 81$ when $n = 4$, a positive whole number

✓ -243

Q23 · ● Greater Depth · 4 marks

METHOD

Common ratio = -3

6th term = $1 \times (-3)^5 = -243$

✓ No

Q24 · ● Greater Depth · 5 marks

METHOD

Solving $2n^2 + 3n + 6 = 72$ does not give a positive whole number for n

✓ 80

Q25 · ● Greater Depth · 4 marks

METHOD

Common ratio = -2

5th term = $5 \times (-2)^4 = 80$

✓ 48

Q26 · ● Greater Depth · 4 marks

METHOD

Common ratio = 2

5th term = $3 \times (2)^4 = 48$

✓No

Q27 · ● Greater Depth · 5 marks

METHOD

Solving $2n^2 + n + 9 = 88$ does not give a positive whole number for n

✓243

Q28 · ● Greater Depth · 4 marks

METHOD

Common ratio = 3

5th term = $3 \times (3)^4 = 243$

✓No

Q29 · ● Greater Depth · 5 marks

METHOD

Solving $3n^2 + n + 1 = 156$ does not give a positive whole number for n

✓No

Q30 · ● Greater Depth · 5 marks

METHOD

Solving $3n^2 - 3n - 9 = 160$ does not give a positive whole number for n