FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

A24: Special sequences

Triangular, square, cube, Fibonacci-type, quadratic and geometric sequences

20 marks · 25 minutes · Non-calculator

1) Write down the next two terms of each sequence.

(a) 1, 3, 6, 10, ...

.....

(1)

(b) 1, 8, 27, 64, ...

.....

(1)

(c) 2, 5, 7, 12, 19, ...

.....

(1)

[Question 1: 3 marks]

2) Here is a geometric sequence: 3, 6, 12, 24, ...

(a) Write down the common ratio.

.....

(1)

(b) Find the 7th term.

.....

(1)

[Question 2: 2 marks]

3) Write down the next term of the geometric sequence $2,\ 2\sqrt{3},\ 6,\ 6\sqrt{3},\ \ldots$

.....

[Question 3: 1 marks]

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4) The first five terms of a Fibonacci-type sequence are $a,\ b,\ a+b,\ a+2b,\ 2a+3b$
The 3rd term is 7 and the 5th term is 19. Find a and b.

a = ... b = ...

[Question 4: 3 marks]

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5) Is the sequence 5, 9, 15, 23, ... linear, quadratic or geometric? Give a reason.

.....

[Question 5: 1 marks]

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6) Name each type of sequence. Choose from: square numbers, geometric, linear (arithmetic).

(a) 1, 4, 9, 16, ...

.....

(1)

(b) 4, 12, 36, 108, ...

.....

(1)

(c) 3, 7, 11, 15, ...

.....

(1)

[Question 6: 3 marks]

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7) Write down the next two terms of the geometric sequence 80, 40, 20, ...

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[Question 7: 1 marks]

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8) Write down the next two terms of the Fibonacci-type sequence 3, 4, 7, 11, ...

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[Question 8: 1 marks]

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9) Find an expression for the nth term of the geometric sequence $5,\ 15,\ 45,\ \ldots$

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[Question 9: 2 marks]

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10) Here is a geometric sequence: $1,\ \sqrt{2},\ 2,\ 2\sqrt{2},\ \ldots$ Find the 8th term. Give your answer in simplest surd form.

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[Question 10: 2 marks]

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11) Write down the 10th triangular number.

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[Question 11: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	(a) 15, 21 (b) 125, 216 (c) 31, 50	B1 each.
2	(a) 2 (b) 192	B1 each.
3	18	B1.
4	$a = 2,\ b = 5$	$a + b = 7$ and $2a + 3b = 19$ (M1); solve (M1); both correct (A1).
5	Quadratic	Differences 4, 6, 8, so the second differences are constant (B1).
6	(a) square numbers (b) geometric (c) linear	B1 each.
7	10, 5	B1.
8	18, 29	B1.
9	$5 \times 3^{n-1}$	Ratio 3 (M1); A1.
10	$8\sqrt{2}$	$(\sqrt{2})^7$ (M1); A1.
11	55	B1.