FOUNDATION & HIGHER

HIGHER EXTENDS

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

A24: Special sequences

Solve problems with Fibonacci-type, geometric, triangular and other sequences

20 marks · 25 minutes · Non-calculator

1) A Fibonacci-type sequence has 3rd term 10 and 6th term 42. Find the first two terms.

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[Question 1: 4 marks]

2) A geometric sequence has 2nd term 6 and 5th term 162. Find the first term and the common ratio.

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[Question 2: 3 marks]

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3) The nth triangular number is $\frac{n(n+1)}{2}$. Find the first triangular number greater than 200

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[Question 3: 3 marks]

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4) The sum of the first n odd numbers is n^2. Find the sum of the odd numbers from 21 to 59

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[Question 4: 3 marks]

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5) A ball is dropped from 128 cm. Each bounce reaches $\frac{3}{4}$ of the previous height. Find the height of the 3rd bounce. After which bounce is the height first less than 30 cm?

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[Question 5: 4 marks]

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6) Find the 30th term of 4, 9, 16, 25, . . .

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[Question 6: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	4 and 6	$a + b = 10$, $3a + 5b = 42$ (P1, P1); solve (P1); A1.
2	2 and 3	$r^3 = 27$ (P1); $r = 3$ (P1); A1.
3	210	$T_{19} = 190$ (P1); $T_{20} = 210$ (P1); A1.
4	800	$30^2 - 10^2$ (P1, P1); A1.
5	54 cm; 6th	128×0.75^3 (P1); 54 (A1); heights 40.5, 30.375, 22.8 (P1); 6th (A1).
6	961	$(n + 1)^2$ (P1, P1); A1.