Test - Binomial expansion and sequences

Year: Year 12 · Duration: 60 minutes · /20

Name:	Date:	**Mark: /20**

Question	1	2	3	4	5	Total
marks	4	4	4	4	4	**20**
Mark						

Show your working.

Question 1 (4 marks)

Question 1 – Binomial expansion

Expand $(2-3x)^4$ up to and including the term in x^2. (3 marks)

Hence estimate 1.97^4 (use $x = 0.01$). (1 mark)

Question 2 (4 marks)

Question 2 – Term in an expansion

Find the coefficient of x^3 in $(1+2x)^5(1-x)$.

Question 3 (4 marks)

Question 3 – Arithmetic series

The 3rd term of an arithmetic sequence is 11 and the 8th term is 31.

a. Find the first term and the common difference. (2 marks)
b. Find the sum of the first 20 terms. (2 marks)

Question 4 (4 marks)

Question 4 – Geometric series

A geometric series has first term 18 and common ratio $\frac{2}{3}$.

a. Find the sum to infinity. (2 marks)
b. Find the smallest n such that the sum of the first n terms exceeds 53. (2 marks)

Question 5 (4 marks)

Question 5 – Problem: a savings pot

A child saves £2 in week 1, £3 in week 2, £4 in week 3 and so on, increasing by £1 each week.

a. How much is saved in week 25? (1 mark)
b. How much in total after 25 weeks? (1 mark)
c. After how many weeks will the total first exceed £500? (2 marks)