

IEB Sequences and series practice — Questions

4 newly generated questions across all 7 sequences and series topics the IEB examines in Paper I — 64 marks in all. Every answer is worked in the memorandum booklet. Nothing here is taken from a past paper.

Geometric sequences

1

[12]

A ball is dropped from a height of 3 m. After each bounce it rises to $\frac{3}{4}$ of the height it fell from.

- (a) How high does the ball rise after the 5^{th} bounce? Give your answer in metres, correct to two decimal places. (2)

Answer: _____

- (b) Calculate the total vertical distance the ball has travelled when it hits the ground for the 8^{th} time. (4)

Answer: _____

- (c) If the ball bounces indefinitely, calculate the total vertical distance it travels. (3)

Answer: _____

- (d) After which bounce does the ball first rise to a height of less than 15 cm? (3)

Answer: _____

-
- (a) In a geometric sequence $T_4 = -54$ and $T_7 = -1458$. Determine the first term and the common ratio. (4)

Answer: _____

- (b) Calculate the sum of the first 8 terms. (2)

Answer: _____

- (c) Determine T_8 . (2)

Answer: _____

- (d) Which is the first term of the sequence whose size is greater than 30000? (4)

Answer: _____

- (e) For which values of x will the series $\sum_{n=1}^{\infty} \left(\frac{x+4}{3}\right)^n$ converge? (3)

Answer: _____

- (f) Calculate the sum to infinity of the series when $x = -3$. (3)

Answer: _____

Arithmetic sequences

3

[17]

-
- (a) $2x + 1$; $4x + 1$ and $x + 11$ are the first three terms of an arithmetic sequence. (3)

Determine the value of x and the three terms.

Answer: _____

-
- (b) Which term of this sequence is equal to 97? (3)

Answer: _____

-
- (c) How many terms of this sequence must be added to give a sum of 434? (4)

Answer: _____

-
- (d) A pattern of dots is built picture by picture. Pictures 1 to 4 have 7; 19; 37; 61 dots, (4)
and the numbers of dots form a quadratic sequence. How many dots are in picture 20?

Answer: _____

-
- (e) Which picture has 2269 dots? (3)

Answer: _____

Consider the arithmetic series $19 + 22 + 25 + 28 + \dots + 157$

-
- (a) Determine a formula for T_n , the general term of the series. (2)

Answer: _____

-
- (b) Determine the number of terms in the series. (3)

Answer: _____

-
- (c) Calculate the sum of the series. (3)

Answer: _____

-
- (d) Write the series in sigma notation. (2)

Answer: _____

-
- (e) The first five terms of a quadratic sequence are $-14; -26; -42; -62; -86; \dots$ (4)
Determine T_n , the n th term.

Answer: _____

-
- (f) Determine whether -762 is a term of this quadratic sequence. (3)

Answer: _____