



QUESTION WORKBOOK

The general binomial expansion

Sequences and series · Year 12–13

6 questions · 26 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** The binomial expansion of $(1 + x)^n$ stops after $n + 1$ terms when n is a positive whole number, but never stops when $n = -1$. Explain the difference, and state the validity condition for the never-ending case. [3]

- A2** Expand $(1 + x)^{-1}$ in ascending powers of x up to the x^3 term, and state the validity. [3]

SECTION B · Standard

- B1** Expand $(1 + 4x)^{1/2}$ in ascending powers of x up to the x^2 term, and state the range of x for which the expansion is valid. [4]

- B2** Expand $(1 + 2x)^{-2}$ up to the x^2 term, state the validity, and use the expansion to estimate 1.02^{-2} . [5]

- B3** Expand $(4 + x)^{1/2}$ up to the x^2 term, and state the validity. [5]

SECTION C · Stretch

- C1** Given that $|x| < \frac{1}{4}$, expand $(1 + 2x)/(1 - 4x)^{1/2}$ in ascending powers of x up to and including the x^2 term. [6]