

HL / Binomial theorem *[26 marks]*

1a. Expand and simplify $\left(x - \frac{2}{x}\right)^4$. *[3 marks]*

1b. Hence determine the constant term in the expansion $(2x^2 + 1)\left(x - \frac{2}{x}\right)^4$. *[2 marks]*

2. Determine the first three terms in the expansion of $(1 - 2x)^5(1 + x)^7$ in ascending powers of x . *[5 marks]*

3. Expand $(2 - 3x)^5$ in ascending powers of x , simplifying coefficients. *[4 marks]*

4. Find the coefficient of x^{-2} in the expansion of $(x - 1)^3\left(\frac{1}{x} + 2x\right)^6$. *[6 marks]*

When $\left(1 + \frac{x}{2}\right)^n$, $n \in \mathbb{N}$, is expanded in ascending powers of x , the coefficient of x^3 is 70.

5. (a) Find the value of n . *[6 marks]*
(b) Hence, find the coefficient of x^2 .