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Year 1 (AS)

Binomial Expansion (sample questions)

The marks shown are for guidance purposes only

When not specified, round all non-terminating decimals to 3 significant figures

Binomial Series:

$$(a+b)^n = a^n + \binom{n}{1} a^{n-1}b + \binom{n}{2} a^{n-2}b^2 + \binom{n}{r} a^{n-r}b^r + \cdots + b^n$$

For $(n \in \mathbb{N})$

Where $\binom{n}{r} = {}^{n}\mathrm{C}_{r} = \frac{n!}{r!(n-r)!}$

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1 Express $\left(\sqrt{5}+2\sqrt{7}\right)^5$ in the form $p\sqrt{5}+q\sqrt{7}$ where p and q are whole numbers to be found **[4marks]**

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2	Show that ${}^{n}C_3 - {}^{n}C_2 = \frac{1}{6}(n^3 - 6n^3 + 5n)$ **[4marks]**

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3	The coefficient of x^3 in the expansion of the expression $(5 + px)^7$ is 7503125. Find the value of p **[3marks]**

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4	Find the coefficient of the term in x^5 in the expansion of the expression $(2 + 5x)(1 + 2x)^8$ **[3marks]**

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5 If $(k+3x)^n = 16384 + 86016x + 193536x^2 + \cdots$
Where k and n are real numbers
Find the values of k and n **[8marks]**

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