



Exam-style questions

- 17 P2:** Find the coefficient of the term in x^5 in the binomial expansion of $(3+x)(4-2x)^8$. (4 marks)
- 18 P1:** The coefficient of x^2 in the binomial expansion of $(1+3x)^n$ where $n \in \mathbb{Q}$ is 495. Determine the possible values of n . (6 marks)
- 19 P2:** Find the value of $\sum_{n=0}^{n=15} (1.6^n - 12n + 1)$, giving your answer correct to 1 decimal place. (6 marks)
- 20 P1:** Prove the binomial coefficient identity $\binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$. (6 marks)
- 21 P2:** Find the sum of all integers between 500 and 1400 (inclusive) that are not divisible by 7. (7 marks)
- 22 P1:** Prove by contradiction that for all $n \in \mathbb{Z}^+$, if $n^3 + 3$ is odd, then n is even. (7 marks)
- 23 P1:** Prove, by mathematical induction, that $5^{2n-1} + 1$ is divisible by 6 for all $n \in \mathbb{N}$. (8 marks)
- 24 P2:** **a** Find the first four terms, in ascending powers of x , of the binomial expansion of $\sqrt[3]{(1-x)}$, $|x| < 1$. (4 marks)
b Use your answer to part **a** to find an approximation for $\sqrt[3]{63}$ to six decimal places. You must show all your working. (5 marks)
- 25 P2:** Seven women and two men are chosen to sit in a row and have their photograph taken.
a How many different ways can they be arranged? (1 mark)
b How many ways can they be arranged if the men must sit together? (2 marks)
c How many ways can they be arranged if the men must sit apart? (2 marks)
d How many ways can they be arranged if there must be at least two women separating the men? (3 marks)