



JZ Mock Set D Paper 1 Solutions

Recommended time: 2 hours

Calculators: not permitted

Format: 20 multiple-choice questions

This is a TMUA-style mock paper modelled on the Test of Mathematics for University Admission. The TMUA is used in admissions for mathematics, economics, computer science, and engineering courses at universities including Cambridge, Oxford, Imperial College London, UCL, LSE, Warwick, and Durham.

Paper Guidance

- These papers contain only hard, very hard, and occasionally *unreasonably hard* TMUA-style questions :). I have deliberately left out the routine and easier material, so please do not be discouraged if you find a paper difficult or need longer than the recommended time. That is exactly how it is meant to feel. Take your time, enjoy the challenge, and remember that struggling with difficult problems is one of the best ways to get better.
- As a rough and deliberately conservative guide, a student who scores above 27 out of 40 across one full set, meaning both papers in four hours, is very likely already working at around the 7.0+ level on the current TMUA scale. However, this is only intended as a guide, not something to worry about too much. The main purpose of these papers is improvement rather than measurement: meet difficult problems, struggle with them, learn from them, and focus on getting better each time.

Best of luck, and enjoy the challenge!

Last updated: 5 September 2026 at 23:13

Spotted an error? Please email jzmaths@hotmail.com.

Question 1

Find the coefficient of x^4 in the expansion of

$$\left(2 - x + \frac{x^2}{2}\right)^5.$$

A 50

B 60

C 70

D 80

E 90

Solution 1

Answer: E

One of a few standard questions. I may decide to replace it with a **non-standard** question at a later date, so take it easy for now!

Using the binomial expansion,

$$\left((2 - x) + \frac{x^2}{2}\right)^5 = (2 - x)^5 + 5(2 - x)^4 \left(\frac{x^2}{2}\right) + 10(2 - x)^3 \left(\frac{x^2}{2}\right)^2 + \dots$$

Only these three terms can contribute to the coefficient of x^4 . Their contributions are

$$\begin{aligned}(2 - x)^5 : \binom{5}{4} 2(-x)^4 &= 10x^4, \\ 5(2 - x)^4 \left(\frac{x^2}{2}\right) : 5 \binom{4}{2} 2^2(-x)^2 \left(\frac{x^2}{2}\right) &= 60x^4, \\ 10(2 - x)^3 \left(\frac{x^2}{2}\right)^2 : 10 \cdot 2^3 \left(\frac{x^4}{4}\right) &= 20x^4.\end{aligned}$$

Therefore, the coefficient of x^4 is

$$10 + 60 + 20 = 90.$$

