



QUESTION WORKBOOK

Modular arithmetic and Fermat's little theorem

Further Pure 2 · Year FM

7 questions · 27 marks

PRINT EDITION

SECTION A · Warm-up

A1 Find the least positive residue of 3^{100} modulo 7. [3]

A2 Find the last digit of 7^{2024} . [3]

SECTION B · Standard

B1 Solve the congruence $5x \equiv 4 \pmod{13}$. [4]

- B2** Use congruences to test 8294 and 8291 for divisibility by 11, and justify the test you use. [4]

- B3** Show that the cube of any integer is congruent to 0, 1 or -1 modulo 9. [3]

- B4** Find the remainder when 15^{81} is divided by 13. [4]

SECTION C · Stretch

C1 Prove that $n^7 - n$ is divisible by 42 for every integer n .

[6]