

Singapore Mathematical Olympiad (SMO) 2015

Senior Section (Round 1 Solutions) Errata

1. Page 35, Question 23: The answer should be 4. Here is the correct solution:

Note that for $k \geq 0$, we have

$$2^{4k+1} \equiv 2 \pmod{10}$$

$$2^{4k+2} \equiv 4 \pmod{10}$$

$$2^{4k+3} \equiv 8 \pmod{10}$$

$$2^{4k+4} \equiv 6 \pmod{10}$$

Since $2015 \equiv 3 \pmod{4}$, we have

$$9 + N \equiv 9 + 1 + (2 + 4 + 8 + 6) + \cdots + (2 + 4 + 8 + 6) + (2 + 4 + 8) \pmod{10}$$

$$\equiv 9 + 1 + (2 + 4 + 8) \pmod{10}$$

$$\equiv 4 \pmod{10}$$

Since N is odd, $(9 + N)^N \equiv 4^N \equiv 4 \pmod{10}$.