

Maths about me: a first-lesson icebreaker for IB

Maths: answers

IB Math Revision · IB Maths SL and HL (AA and AI) · Teacher answers and notes

The starter is non-calculator. A GDC is useful for task A.

Teacher notes

- Nothing personal is collected: students work on paper, and nothing is typed into the site or stored. If a student would rather not use a real birthday, any date works.
- Pairs for task B: each student writes one riddle with exactly one answer and swaps with a partner, who checks that only one number fits.
- Mindset prompts for the first lesson (for you to read out or put on the board; nothing is collected or stored): 'A time maths felt hard, and what helped'; 'One topic from last year I could teach a friend'; 'What I do when I am stuck'; 'How I want this class to feel'.
- The riddles preview the first topics of the course: sequences and series, exponents and logarithms, and counting.

Starter

1. **4**

- $x^2 = 3x + 4$, so $(x - 4)(x + 1) = 0$
- $x = 4$ (the other root, -1 , is not positive)

2. **43**

- $u_{10} = 7 + 9 \times 4 = 43$

3. **10**

- $\log_2 64 = 6$ and $\log_3 81 = 4$
- $6 + 4 = 10$

4. **120**

- $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$

Task A: Maths about me

a. **$28 = 2^2 \times 7$ and $2009 = 7^2 \times 41$**

- $28 = 4 \times 7 = 2^2 \times 7$
- $2009 = 7 \times 287 = 7 \times 7 \times 41$, and 41 is prime

b. **HCF = 7, LCM = 8036**

- HCF = 7 (the only common prime, to the lower power)
- $\text{LCM} = 2^2 \times 7^2 \times 41 = 8036$

c. **The 92nd term, 2008**

- $u_n = 6 + 22(n - 1)$
- $6 + 22(n - 1) = 2009$ gives $n - 1 = 91.04\dots$
- $u_{92} = 6 + 22 \times 91 = 2008$ (and $u_{93} = 2030$)

d. **$x = 4.81$**

- $x = \log_2 28 = \ln 28 / \ln 2 = 4.807\dots$

Task B: 'Who am I?' in pairs

a. **792**

- Three-digit multiples of 99: 198, 297, ..., 990.
- Only 792 starts with 7.

b. **225, with $n = 15$**

- $1 + 3 + \dots + (2n - 1) = n^2$
- The only square between 200 and 250 is $225 = 15^2$.

c. **18**

- $r = 4/12 = 1/3$
- $S_{\infty} = 12 / (1 - 1/3) = 18$

d. **10**

- $n(n - 1)/2 = 45$, so $n^2 - n - 90 = 0$
- $(n - 10)(n + 9) = 0$, so $n = 10$

Task C: Four 4s

a. **$4 \times 4 + 4 + 4 = 24$**

- $16 + 8 = 24$

b. **$(4 + 4) \times (4 + 4) = 64$**

- $8 \times 8 = 64$

c. **$4! - 4 - 4/4 = 19$**

- $24 - 4 - 1 = 19$

d. **$4^4 + 4/4 = 1024$**

- $4 + 4/4 = 5$ and $4^5 = 1024$

Extension

1. **$(10a + b) + (10b + a) = 11(a + b)$**

- Write the number as $10a + b$; its reverse is $10b + a$.
- The sum is $11a + 11b = 11(a + b)$, a multiple of 11.

2. **12, 24, 36 and 48**

- $10a + b = 4(a + b)$ gives $b = 2a$.
- $a = 1, 2, 3, 4$ give 12, 24, 36, 48.

Every question is original and every answer was recomputed by computer before publishing.