

Maths about me: a start-of-term icebreaker for IGCSE and GCSE: answers

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · Teacher answers and notes

No calculator needed.

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'.
- Four 4s: keep a class list of the targets from 1 to 20 that have been made, and add to it during the first weeks of term.

Starter

1. 73

- Two-digit primes with digit sum 10: 19, 37, 73.
- Only 73 has the bigger tens digit.

2. 81

- The squares are 64 and 81.
- $64 = 8 \times 8$ and $81 = 8 \times 10 + 1$.

3. 30

- The LCM of 6 and 15 is 30.
- The next common multiple is 60, which is too big.

4. 8

- $8 + 1 = 9 = 3^2$.
- No other cube up to 10 000 works: $27 + 1 = 28$, $64 + 1 = 65$, $125 + 1 = 126$, ...

Task A: Maths about me

a. $24 = 2^3 \times 3$ and $132 = 2^2 \times 3 \times 11$

- $24 = 2 \times 12 = 2 \times 2 \times 6 = 2 \times 2 \times 2 \times 3$
- $132 = 2 \times 66 = 2 \times 2 \times 33 = 2 \times 2 \times 3 \times 11$

b. HCF = 12, LCM = 264

- HCF: the common prime factors $2^2 \times 3 = 12$
- LCM: the highest powers $2^3 \times 3 \times 11 = 264$

c. 18 numbers; 14 are even

- All orders: $4 \times 3 \times 2 \times 1 = 24$. Those starting with 0 are not 4-digit numbers: $3 \times 2 \times 1 = 6$. So $24 - 6 = 18$.
- Ending in 0: $3 \times 2 \times 1 = 6$. Ending in 2: $2 \times 2 \times 1 = 4$ (the first digit cannot be 0). Ending in 4: also 4. Even: $6 + 4 + 4 = 14$.

Task B: 'Who am I?' in pairs

a. **154**

- Multiples of 77 between 100 and 200: 154 only.
- $1 + 5 + 4 = 10$

b. **61**

- One less than me is a multiple of 2, 3, 4, 5 and 6.
- $\text{LCM}(2, 3, 4, 5, 6) = 60$, so I am $60 + 1 = 61$.

c. **38 or 83**

- $(10a + b) + (10b + a) = 11(a + b) = 121$, so $a + b = 11$.
- Digits adding to 11 and differing by 5: 8 and 3. So 38 or 83.

Task C: Four 4s

a. **$4/4 + 4/4 = 2$**

- $1 + 1 = 2$

b. **$44/4 - 4 = 7$**

- $44 \div 4 = 11$, and $11 - 4 = 7$

c. **$4 + 4 + 4/4 = 9$**

- $8 + 1 = 9$

d. **$(4 + 4/4) \times 4 = 20$**

- $4 + 1 = 5$, and $5 \times 4 = 20$

Extension

1. **$4 \times 4 - 4/4 = 15$ and $4 \times 4 + 4/4 = 17$**

- $16 - 1 = 15$ and $16 + 1 = 17$

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

- $10a + b = 4(a + b)$ gives $6a = 3b$, so $b = 2a$.
- $a = 1, 2, 3, 4$ give 12, 24, 36, 48 ($a = 5$ would need $b = 10$).

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