

## Instructions

- 1. Solve the puzzles below.
- 2. Convert the answers to base 3.
- 3. Write the answers in the boxes on the front cover.
- 4. Colour squares containing a 1 green. Colour squares containing a 2 red. Leave squares containing a 0 unshaded.

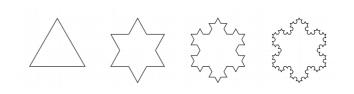
## Puzzles

- 1. The square number larger than 1 whose square root is equal to the sum of its digits.
- 2. The smallest square number whose factors add up to a different square number.
- 3. The largest number that cannot be written in the form 23n+17m, where *n* and *m* are positive integers.
- 4. Write down a three-digit number whose digits are decreasing. Write down the reverse of this number and find the difference. Add this difference to its reverse. What is the result?
- 5. The number of numbers between 0 and 10,000,000 that do not contain the digits 0, 1, 2, 3, 4, 5 or 6.
- 6. The lowest common multiple of 57 and 249.
- 7. The sum of all the odd numbers between 0 and 66.
- 8. One less than four times the 40th triangle number.
- 9. The number of factors of the number  $2^{\overline{756}} \times 3^{12}$ .
- 10. In a book with 13,204 pages, what do the page numbers of the middle two pages add up to?
- 11. The number of off-diagonal elements in a 27×27 matrix.
- 12. The largest number, *k*, such that 27k/(27+k) is an integer.

Merry Christmas

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