

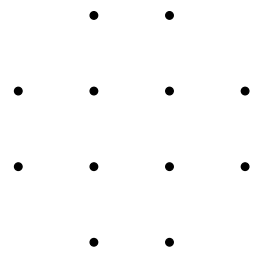
MATHEMATICAL CHALLENGE 2020–2021

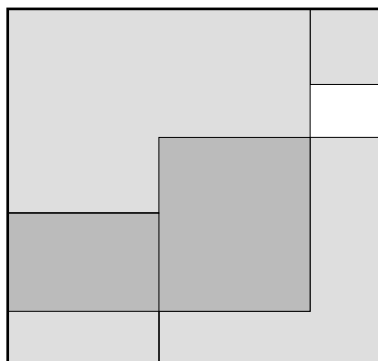
Entries must be the unaided efforts of individual pupils.

Solutions must include explanations and answers without explanation will be given no credit.

Do not feel that you must hand in answers to all the questions.

Junior Division: Problems 2

- J1.**
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- Twelve points are marked on a square grid, as shown. How many squares can be formed by joining four of these points?
- J2.** The product of the digits of the number 318 is 24. How many 3-digit numbers have digits with product 24?
- J3.** Water weighs 1000 grams per litre and ether weighs 716 grams per litre. Four litres of a mixture of the two weigh 3.29 kg.
How much water does the mixture contain?
- J4.** Imran bought a cat and dog for £60 each. Later he sold them. He made a profit of 20% on the dog. He made a loss of 20% on the cat.
How much did Imran get altogether when he sold the cat and dog?
- Later Andy bought another cat and dog. He sold them for £60 each. He made a profit of 20% on the dog. He made a loss of 20% on the cat.
Did Andy make a profit or loss on the whole deal? If so, how much?
- J5.**



Four square sheets of tinted glass with sides 10 cm, 20 cm, 30 cm and 40 cm are placed in a rectangular box as shown. 70 square cm of the base of the box are left uncovered (white in the diagram).

What is the area of overlap of the sheets of glass (dark grey in the diagram)?

END OF PROBLEM SET 2