

MATHEMATICAL CHALLENGE 2020–2021

Entries must be the unaided efforts of individual pupils.

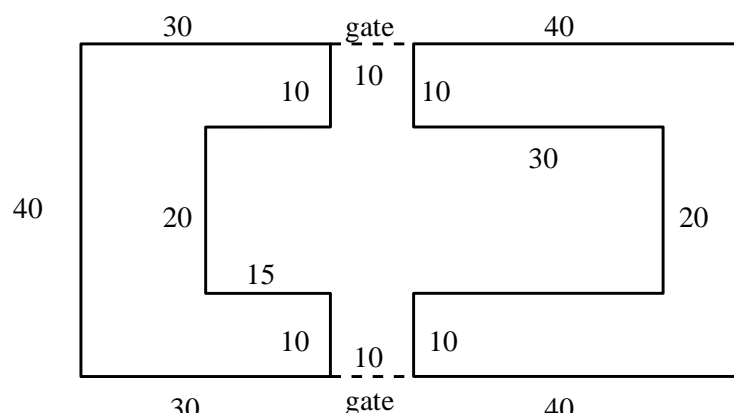
Solutions must include explanations and answers without explanation will be given no credit.

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

Junior Division: Problems 1

- J1.** The owner of some stables has to fill in yet another form and so he writes:
“My herd consists of horses and foals.
A fifth of the herd is in the yard and a third of the herd is out to pasture. These are all horses.
Three times the difference are the foals, which are in the barn. The remaining two horses, in the paddock, belong to my daughter.”
How many animals are in the herd altogether?
- J2.** The floor of a rectangular room is covered with square tiles. The room is 10 tiles long and 7 tiles wide. In addition, there is a bay window in the middle of a long wall of the room which is 2 tiles deep and 6 tiles across. How many of the tiles have at least one edge which touches a wall of the room?
- J3.** Hanna scored an average of 69% on 7 tests. If the lowest scoring test is omitted, what is her highest possible average on the remaining six tests?
- J4.** Jo is going on an 8-day activity holiday. Each day she can choose one of the water sports: kayaking or sailing, or land-based sports. She never does different water sports on consecutive days. She also wants to try all three options on at least one day of her holiday.
How many different schedules are possible?

J5.



This is the plan of a building which has a courtyard with two entrance gates. Passers-by can look in through the gates but may not enter. The dimensions are given in metres and all corners are right angles. What is the area of the part of the courtyard which cannot be seen by passers-by?