

The Scottish Mathematical Council

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MATHEMATICAL CHALLENGE 2019–2020

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.

CURRENT AND RECENT SPONSORS OF MATHEMATICAL CHALLENGE ARE

The Edinburgh Mathematical Society, The Maxwell Foundation, Professor L E Fraenkel,

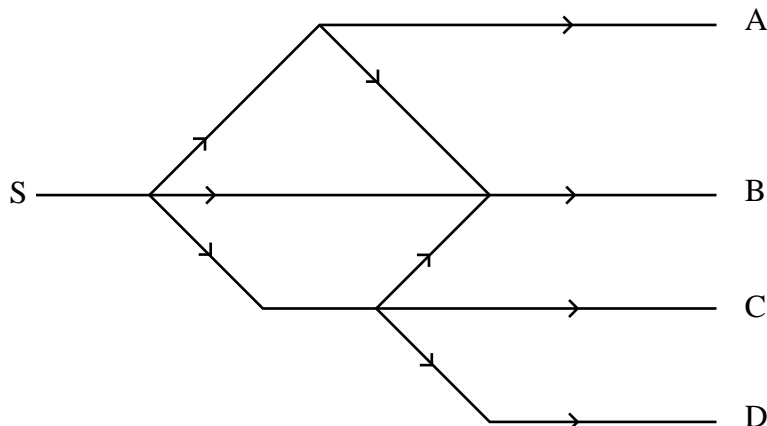
The London Mathematical Society and The Scottish International Education Trust.

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Junior Division: Problems 1

- J1.** A farmer has packed several baskets either with chicken eggs or with duck eggs. The number of eggs in each basket is 5, 6, 12, 14, 23 and 29. Her daughter says “If we sell one basket then we will have twice as many chicken eggs as duck eggs left”. Which basket was the daughter thinking about?
- J2.** Three rugs have a combined area of 200 m^2 . By overlapping the rugs to cover a floor area of 140 m^2 , the area which is covered by exactly two layers of rug is 24 m^2 . What is the area of floor that is covered by three layers of rug?
- J3.** A cup of coffee costs more than £1 but less than half the cost of a piece of cake. Two cups of coffee and seven pieces of cake cost £18.27. How much could a cup of coffee cost? (The prices are exact whole numbers of pence.)
- J4.** More than 10 but fewer than 30 hikers set out on a walk. When they stopped for lunch the party decided to split, one group taking a shorter route back. Harry led the group taking the shortcut and Mac led the other. Each hiker chose their group, but during lunch Colin changed his mind and decided to join Harry's group. This gave the same number in each group. However Colin began to feel much stronger after his lunch and decided to go with Mac after all, and Dave also decided to push on with Mac. The number of hikers in each group was now a prime number. How many hikers returned in each group?
- J5.** Rhoda Rat is put in a maze at the start, S. She can move forward only in the direction of the arrows. At each junction she is equally likely to choose any of the forward paths. What is the probability that she ends up at B?



END OF PROBLEM SET 1