

The Scottish Mathematical Council

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MATHEMATICAL CHALLENGE 2009–2010

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, Professor L E Fraenkel,

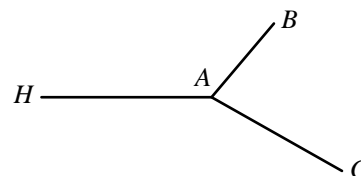
The London Mathematical Society and The Scottish International Education Trust.

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Junior Division: Problems 1

- J1.** From his home H , a travelling salesman has to make 12 deliveries, 4 to each of the towns A , B and C as shown on the diagram. For his travel he gets a mileage allowance of 50p per mile. He claims for 4 return journeys from home to each of the towns A , B and C .



But he actually made the deliveries on a total of 4 trips, each trip going from H to A to B to A to C to A and back to H . If, by his dishonest claim, he made an additional £160, how far is it from H to A ?

- J2.** Four old-timers, John, Willie, Andy and Greig, take their wives to a tea-dance. At one point during the dance, the partners were as follows:

Flo is dancing with Willie.

Hettie is dancing with Beeb's husband

Mary is dancing with Hettie's husband.

Andy is dancing with Greig's wife.

Greig is dancing with Willie's wife.

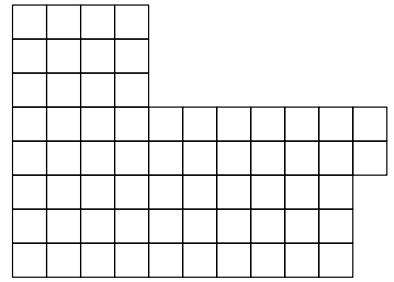
Identify the married couples.

- J3.** Four boys, each of whom work at the same rate, decided to lay a path from a cottage to the beach. Because of an argument, two of the boys only worked for one day and the job was then completed by the other two. This resulted in the work taking two more days than originally intended. How long would it have taken if all four had worked to lay the path?

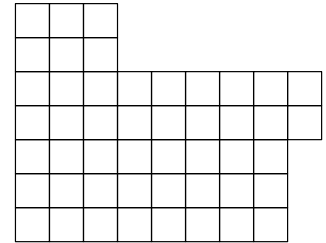
- J4.** Mr and Mrs McLeod have six children – Andrea, John, Eilidh, Rory, Fiona and Pat. Just before Christmas, the six children went on their own to town to do some shopping. They all spent some money, each spending a whole number of pounds. When they returned home, they told their parents, in a roundabout way, how much they had spent as follows: Andrea and John together had spent £26, Eilidh and Rory together had spent £20 and Fiona had spent £9. They didn't say how much Pat had spent, but they did say that one of them had spent £15 more than the average for all the children. Mr and Mrs McLeod thought about this and then started arguing about how much Pat had spent. Explain why they were arguing and say what you can about the amount Pat had spent.

J5.

By cutting along the lines, can you divide the shape on the right into two pieces which can be fitted together to make an eight by eight square?



By cutting along the lines, can you divide the shape on the right into two pieces which can be fitted together to make a seven by seven square?



Justify your conclusions.

END OF PROBLEM SET 1