The Scottish Mathematical Council

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MATHEMATICAL CHALLENGE 2011−2012

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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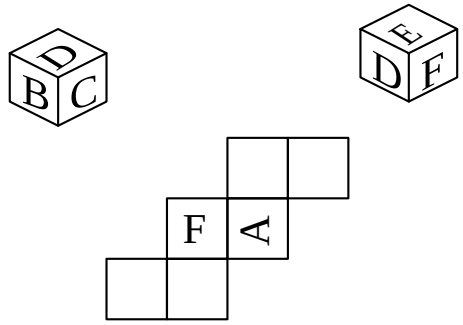
Junior Division: Problems 1

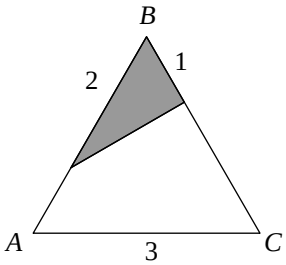
J1. A cube has the letters A, B, C, D, E and F marked on the faces. Below are two views of the cube. Use these to complete the net. **Describe each of your steps.**



J2. A four-digit PIN number '*rrss*', where *r* and *s* are different digits, is a multiple of 15. Which values of *r* are not possible?

J3. At a meeting of the Young Historical Society (YHS) in a local library the number of children present was three times the number of parents. At this meeting, each boy borrowed 12 books from the library, each girl borrowed 17 books and each parent borrowed 9 books. In total 305 books were borrowed. How many girls were there at the YHS meeting?

J4. The triangle *ABC* is equilateral. What fraction of it is shaded?
Explain your reasoning.



J5. Six cousins have a get together and discover that the mean of their ages is 19. Four of the ages are 21, 19, 23 and 11 and range of all six ages is 20. Find the other two ages.
Explain your reasoning.

END OF PROBLEM SET 1