The Scottish Mathematical Council

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MATHEMATICAL CHALLENGE 2016-2017

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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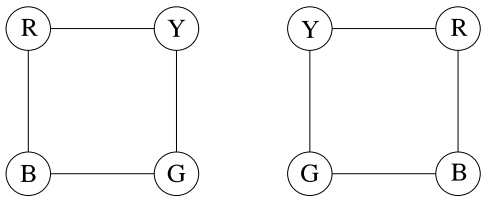
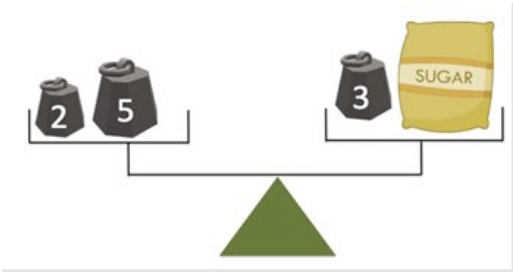
Primary Division: Problems II

P2.1. Four coloured beads, red, yellow, green and blue, are attached to the corners of a square. Two arrangements like those shown are considered to be the same because one square can be placed on top of the other by rotating and/or flipping so that the colours match. What is the total number of different arrangements (including the one shown)?



P2.2. A shopkeeper has a set of weights with values 200 grams, 300 grams and 500 grams.

Using these weights he can weigh different amounts: for example he can weigh 400 grams by putting the 200 gram and 500 gram weights on one side of the scales and the 300 gram weight and the bag to be filled on the other side.



And of course he can put one or more of the weights on one side of the scales and a bag to be filled on the other side.

Show that using these weights he can weigh all amounts from 100 grams to 1000 grams in steps of 100 grams except for one.

P2.3. James thought of three numbers. He told his friend that the first and second numbers added up to 37, the second and third added up to 53, and the first and third added up to 78. What were the numbers which James thought of?

END OF PROBLEM SET II