The Scottish Mathematical Council

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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Primary Division: Problems I

P1.1. Harry wants to make a magic potion using these instructions provided by his teachers:

- You need to use at least three of the following five ingredients: Lacewing flies, Bat tongue, Hairy fungus, Moondew and Dragon blood.
- If you use Lacewing flies you cannot use Hairy fungus or Moondew.
- If you use Bat tongue you cannot use Moondew.

What are the ways that Harry can make the potion?

P1.2. 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?

P1.3. Three rugs have a combined area of 200 m². By overlapping the rugs to cover a floor area of 140 m², the area which is covered by exactly two layers of rug is 24 m². What is the area of floor that is covered by three layers of rug?

END OF PROBLEM SET I