

# The Scottish Mathematical Council

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## MATHEMATICAL CHALLENGE 2006–2007

Entries must be the unaided efforts of individual pupils. Solutions must include explanations.

**Answers without explanation will be given no credit.**

*CURRENT AND RECENT SPONSORS OF MATHEMATICAL CHALLENGE ARE*

*The Edinburgh Mathematical Society, Professor L E Fraenkel,*

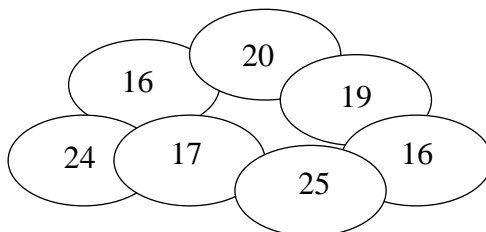
*The London Mathematical Society and The Scottish International Education Trust.*

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### Junior Division: Problems 2

- J1.** In cleaning out a drawer, Mrs Smith found two old watches which she and her husband had discarded. She wound them up, and, after setting them accurately, started both watches at the same time. An hour later she noticed that her old watch had gained one minute while her husband's had lost two minutes. Checking them from time to time, it was clear that her old watch was running consistently fast and her husband's consistently slow. Next morning, when she looked at the watches again, it was 7 o'clock on her old watch and 6 o'clock on her husband's. What time was it when she started the watches running?
- J2.** A quiz had only 3-point questions and 5-point questions. The best possible score is 100 and there are 26 questions? How many of each type are there?
- Caitlin and Zak each attempt the quiz. Caitlin scores one and a half times as many points as Zak. Every question that Zak answers correctly, Caitlin also answers correctly, but she answers an additional 10 questions correctly. What were the scores of Caitlin and Zak? (No partial marks were awarded.)
- J3.** The Broon family from Glebe Street, all eleven of them, went on a shopping spree to Auchenshuggle. Ten of them spent exactly £20 each but Horace was extravagant. He spent £10 more than the average for the whole family. How much did Horace spend?
- J4.** A merchant has an odd collection of barrels of wine and one barrel of beer as shown below with their capacities in gallons.



He gets rid of all of it by selling off some barrels of wine to one customer, twice that quantity of wine to another customer and keeping the barrel of beer for himself. How many gallons did the barrel of beer contain?

- J5.** On a Wednesday in the middle of July in the Millennium year, Mrs Peat was exhibiting her collection of rare flowering plants to members of her horticultural society. She was particularly proud of three luxuriously flowering plants. They were quite delicate and each individual flower only lasted for a single day. The plant with crimson flowers blossomed every fourth day, the one with lavender flowers every seventh day and the one with yellow flowers every thirteenth day. The members of the horticultural society were delighted so Mrs Peat invited them to come again. “Let us meet again on the same Wednesday next year, which is the first time they will all be in bloom together again”. Was Mrs Peat’s statement correct?

**END OF PROBLEM SET 2**