The Scottish Mathematical Council

MATHEMATICAL CHALLENGE 2008–2009

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.

Primary Division: Problems III

**P3.1.** *Grand Central Station*

The street system in New York is built up as a series of blocks. The section in which Claire works is 4 blocks wide and 7 blocks long with Grand Central Station located at the top North West corner of the section.

When asked where she worked she would not say exactly but said that from Grand Central Station she could take a different route to work every day (including Saturdays and Sundays) of February 2009 but that on the March 1st, she would need to repeat a route already used.

If Claire only walks either south or east, find out where she works.

Give your answer as a grid location from the station. For example, *P* is 4 blocks south and 3 blocks east.

Hint: *How many different ways can Claire take to get to 1 block south and 2 blocks east.*
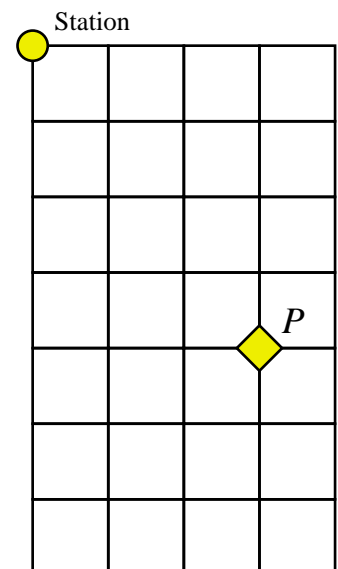
P3.2. During a certain period of days, observations were made on the weather. It was noted that whenever it rained in the morning it was clear in the afternoon and whenever it rained in the afternoon, it had been clear on that morning. During this period, it rained on 9 days and was clear on 6 mornings and on 7 afternoons. How long was the period of days?

P3.3. Once a week, a cyclist leaves home to cycle to the golf course. On one particular day, at 15:56, one fifth of the way to the course, he passes the town clock. At 16:05, half way to the course, he passes the school gate. At what time does he leave home and when does he reach the golf course?

END OF PROBLEM SET III