



## Problem of the Week

### Problem B

#### Gregorian Calendars

The Gregorian Calendar is used in most parts of the world today. In order to keep this calendar in sync with the solar year (the time for the Earth to complete one orbit around the sun), it has leap years with an extra day in February. Leap years generally occur every four years, in years that are divisible by 4. However, years divisible by 100 are excluded, UNLESS they are divisible by 400. For example, the year 2000 was a leap year, but 1900 was not.

The year 2025 has a different calendar than the year 2024 since it started on a different day of the week. January 1, 2024 was on a Monday, while January 1, 2025 was on a Wednesday.

- (a) January 1, 2023 was on a Sunday. Explain why January 1, 2024 was one day of the week later than in 2023, while January 1, 2025 was two days of the week later than in 2024.
- (b) January 1, 1992 and January 1, 2025 were both on a Wednesday. Did 1992 have the same yearly calendar as 2025?
- (c) How many different yearly calendars are there in total? Two yearly calendars are considered the same if each date occurred on the same day of the week.

