

I U P U I
MATH CLUB TEASER #10

January 30, 2009
(due February 6, 2009)

SOLUTION

Grothendieck the Guru was born on January 1st, 1897.

After 365 days the day of the week moves forward by one. For instance, since January 1, 2009 was a Thursday, we know that January 1, 2010 will be a Friday (won't the Guru be happy?).

A seven year period usually includes one or two leap years each of which adds an extra day. Thus, from the first Friday of a year to the same date seven years later, the day of the week moves $7+1$ or $7+2$ days (seven periods of 365 days plus the extra leap days). When this happens the day of the week changes.

The only exception to the above happens when leap years are omitted. Leap days are added when the year number is a multiple of four like 2008, except when the year number is a multiple of 100 like 1900 (then again, multiples of 400 like 2000 **are** leap years). This allows for a stretch of seven years without leap days so that seven intervals of 365 days make seven full years.

The last time this happened was around 1900. The seven year interval must begin on 1897, whose first Friday was January 1st. Then, 7×365 days later the same date occurred on the first Friday of 1904.

SOLVED BY:

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