

IMSc - RAM Math Circle - Chennai
Synopsis for August 23, 2026

The worksheet for this session was intended to continue the exploration of “wrap-around” ideas that arose naturally in the polygon-walking activity and in the children’s work with ciphers.

The central idea:

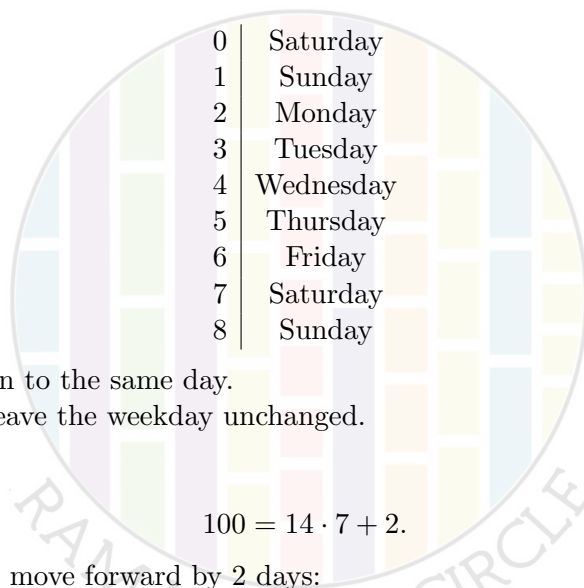
For weekdays, only the remainder after division by 7 matters.

The aim is *not* to begin with a formal definition of modular arithmetic. Instead, the children should encounter the same phenomenon in a new setting and gradually recognize the common mathematical structure.

The seven-day cycle

The first section established the basic cyclic structure.

If today is Saturday, the sequence is



0	Saturday
1	Sunday
2	Monday
3	Tuesday
4	Wednesday
5	Thursday
6	Friday
7	Saturday
8	Sunday

After 7 days we return to the same day.

14 and 21 days also leave the weekday unchanged.

For 100 days,

$$100 = 14 \cdot 7 + 2.$$

Thus we only need to move forward by 2 days:

Saturday $\rightarrow$ Sunday $\rightarrow$ Monday.

Hence

100 days after Saturday is Monday.

Students discovered that:

- Only the remainder matters.
- Numbers that differ by a multiple of 7 have exactly the same effect on the day of the week.

Moving through years

A normal year has

$$365 = 52 \cdot 7 + 1.$$

Therefore a normal year shifts the weekday by

1.

If January 1 is Thursday, the following January 1 is Friday.
A leap year has

$$366 = 52 \cdot 7 + 2.$$

Therefore a leap year shifts the weekday by

2.

If January 1 of a leap year is Thursday, January 1 of the following year is Saturday.
This is a good place to establish the useful rule:

Year	weekday shift
normal	1
leap	2

Remainders for months

The month remainders are:

Month	Days	Remainder mod 7
January	31	3
February	28	0
March	31	3
April	30	2
May	31	3
June	30	2
July	31	3
August	31	3
September	30	2
October	31	3
November	30	2
December	31	3

The children calculated the first day of each month starting from

January 1, 2026 = Thursday.

Date	Weekday
February 1	Sunday
March 1	Sunday
April 1	Wednesday
August 1	Saturday
December 1	Tuesday

A date in the middle of a month

For August 25, the number of days in the complete months before August is

$$31 + 28 + 31 + 30 + 31 + 30 + 31 = 212.$$

From August 1 to August 25 we move

$$25 - 1 = 24$$

days.

Therefore the number of days after January 1 is

$$212 + 24 = 236.$$

Now

$$236 = 33 \cdot 7 + 5.$$

Thus we move forward five days from Thursday:

Thursday $\rightarrow$ Friday $\rightarrow$ Saturday $\rightarrow$ Sunday $\rightarrow$ Monday $\rightarrow$ Tuesday.

Hence

August 25, 2026 will be a Tuesday.

Inventing a method?

The children should be able to articulate more-or-less the following steps:

1. Choose a reference date whose weekday is known.
2. Count the number of days between the reference date and the target date.
3. Divide this number by 7.
4. Keep only the remainder.
5. Move forward or backward by that many weekdays.

The key mathematical statement being

$$N = 7q + r, \quad 0 \leq r < 7.$$

and only r affects the weekday.