

## NINE DAYS IN ONE SECOND

***This activity might be used during our show.  
Please use it only after the performance!***

**Math skills:** Addition and multiplication  
**You will need:** Calendar and calculator (or paper and pencil)  
**Difficulty level:** 3

**Introduction:** Tell your students that you can add the sum of nine days on the calendar faster than they can on their calculators:

**What to do:**

Ask a volunteer to mark on any page a group of 9 days on the calendar in a box of 3x3 (see example)

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

- ◆ Ask your students to add those nine days together on their calculators or papers while you tell them the sum (adding in your head) first.

**How it works:**

- ◆ The key to understanding this trick is based on the consecutive order of the numbers in the calendar.
- ◆ All you have to do is to take the central number and multiply it by 9 ( $10 \times 9 = 90$ ) while they are adding  $2+3+4+9+10+11+16+17+18=90!$

**Why it works:**

Let A be the central number of the 3x3 square of numbers from the calendar. Then the numbers have the following values:

A-1-7	A-7	A+1-7
A-1	A	A+1
A-1+7	A+7	A+1+7

The sum of the numbers is:

$$A-1-7+A-7+A+1-7+A-1+A+A+1+A-1+7+A+7+A+1+7=9A$$

Notice that the numbers around the central number have a reciprocal relationship:

$$\begin{aligned}A-1-7 + A+1-7 &= 2A \\A-7 + A-7 &= 2A \\A+1-7 + A-1+7 &= 2A \\A-1 + A+1 &= 2A\end{aligned}$$

These pairs sum to 8A and with the central number added to 9A.

A is the average value of all nine numbers, because the central number is A and all other numbers differ from A but can be paired with an opposite number that differs by the same increment in the opposite direction.