

**Olga Jurak**

**Dominika Markiewicz**

Wydział Matematyki i Informatyki



Uniwersytet  
Wrocławski

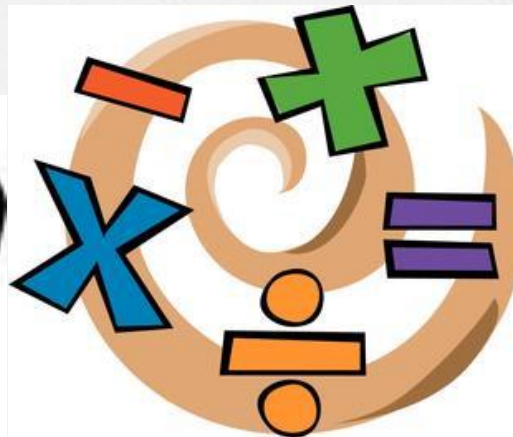
# Techniki sprytnych rachunków

# Plan

1. Jak liczyć szybciej i sprytniej?
2. Jak skonstruować sztuczkę matematyczną?
3. Kto liczy najszybciej?

## Rada 1.

**Dobrze opanuj własności działań  
i poznaj tabliczkę mnożenia**



# Pomocne dłonie



A white rectangular card is pinned to a background of scattered 3D numbers. The card is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface. The text on the card is centered and reads "Mnożenie przez 9" in a dark blue font.

**Mnożenie przez 9**


$$9.7 =$$



$9 \cdot 7 = ?$

$$9 \cdot 7 = ?$$

**L**

liczba palców z lewej strony

**6****P**

liczba palców z prawej strony

**3**



$$9 \cdot 7 = 63$$

**L**

liczba palców z lewej strony

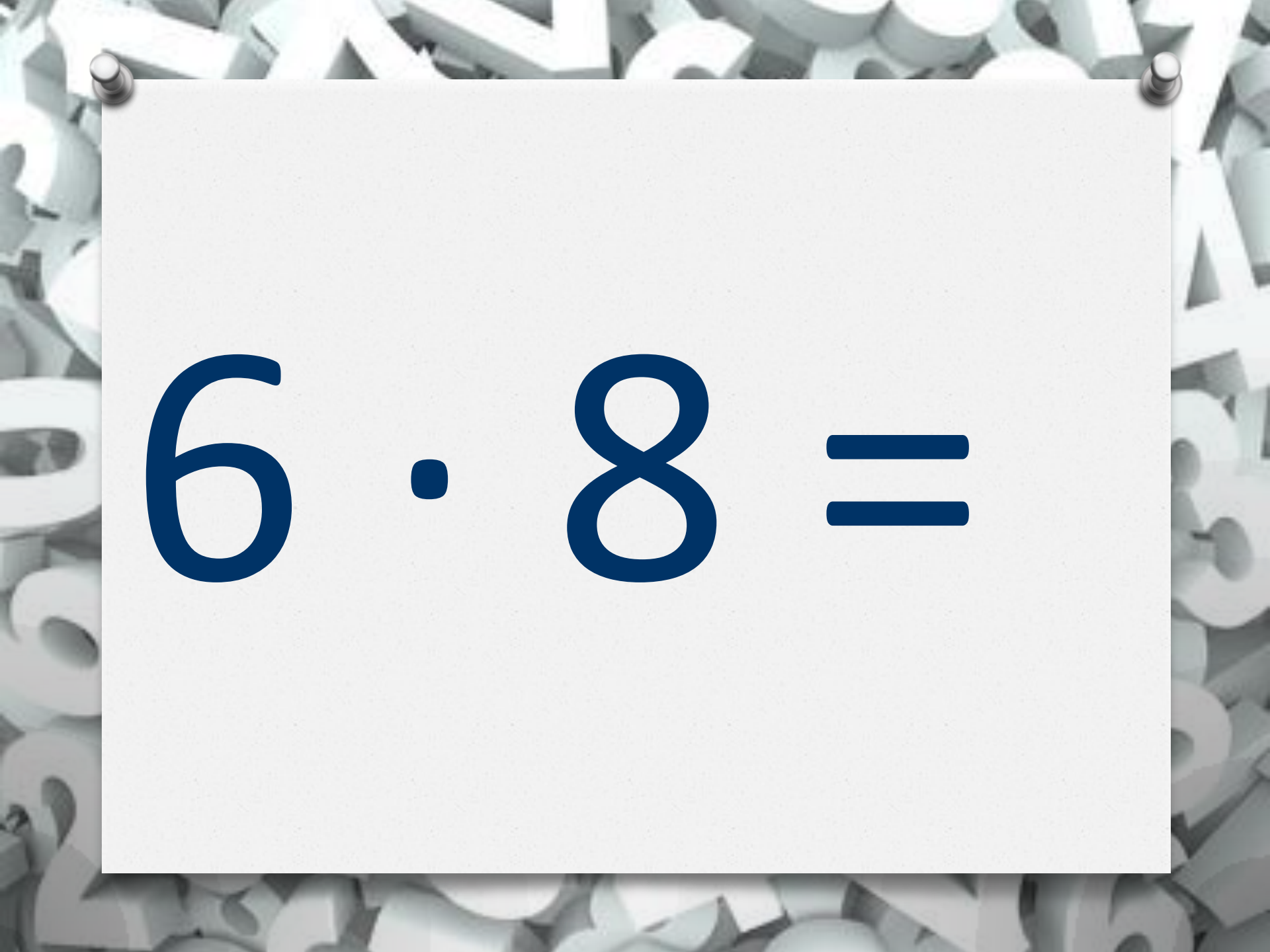
**6****P**

liczba palców z prawej strony

**3**

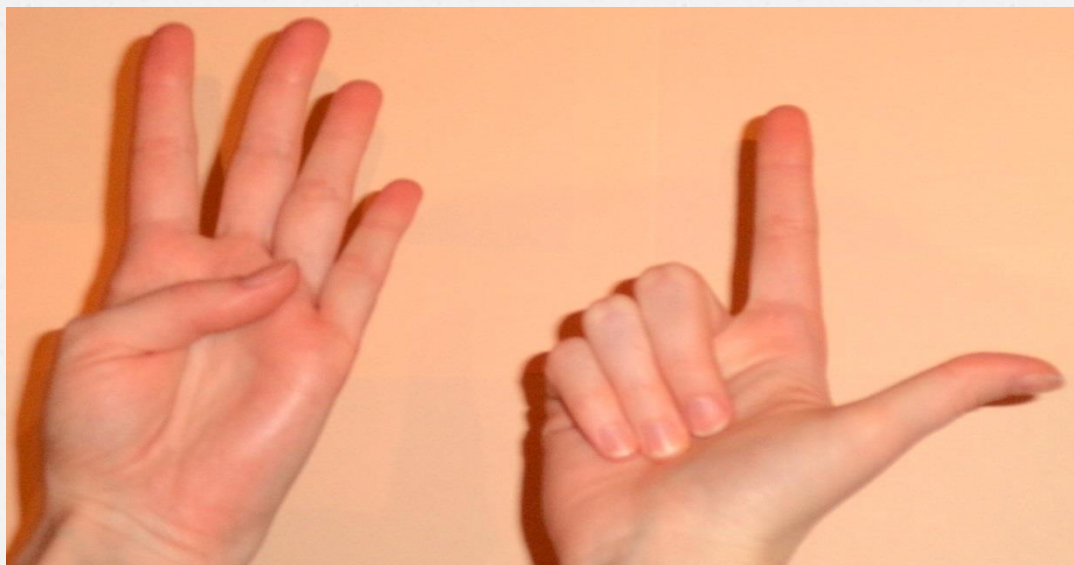
A white rectangular card is pinned to a background of scattered 3D numbers. The card is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface. The text on the card is in a bold, dark blue font.

**Mnożenie przez  
liczby od 5 do 10**


$$6 \cdot 8 =$$


$$6 \cdot 8 = ?$$

$$6 \cdot 8 = ?$$

**S**

suma liczb zgiętych palców

**4****I**

iloczyn liczb wyprostowanych palców

**8**

$$6 \cdot 8 = 48$$

**S**

suma liczb zgiętych palców

**4****I**

iloczyn liczb wyprostowanych palców

**8**

# Pionowo i na krzyż



A white rectangular card is pinned to a background of scattered 3D numbers. The card is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface.
$$89 \cdot 97 = ?$$




$$89 \cdot 97 = ?$$

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

$$89 \quad 11$$

$$97 \quad 3$$

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89

11



97

3

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89

11



97

3

$$11 \cdot 3 = 33$$

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89

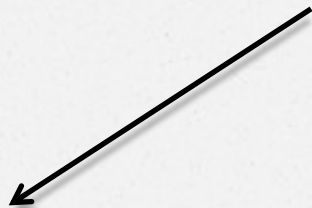
11



$$11 \cdot 3 = 33$$

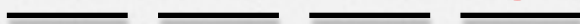
97

3



3

3



$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89      11

97      3

\_\_\_\_\_ 3 3

$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89

11



$$89 - 3 = 86$$

97

3

\_\_\_\_\_ 3 3



$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

89

11

97

$$89 - 3 = 86$$

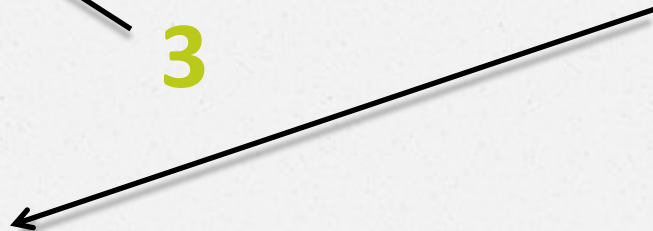
3

8

6

3

3



$$89 \cdot 97 = ?$$

$$100 - 89 = 11$$

$$100 - 97 = 3$$

$$89 \quad 11$$

$$97 \quad 3$$

$$\underline{8} \quad \underline{6} \quad \underline{3} \quad \underline{3}$$

$$89 \cdot 97 = 8633$$

## **Rada 2.**

**Im prościej, tym lepiej**



## Sprytne działania

- mnożenie i dzielenie przez 10, 100, 1000, ...
- mnożenie przez 11, 101, 1001, ...
- mnożenie przez 9, 99, 999, ...
- mnożenie przez 5, 50, 25, 250, ...
- dzielenie przez 5, 50, ...
- mnożenie przez 9, 19, 199, 21, 201, ...

**Rada 3.**

**Twórz własne strategie rachunkowe**



A white rectangular card is pinned to a background of scattered 3D letters. The card is held in place by two silver pushpins at the top corners. The background consists of numerous white, three-dimensional letters of various sizes and orientations, creating a textured, abstract pattern. The text on the card is written in a bold, dark blue font.

**Wydawanie reszty**


$$451 - 187 = ?$$

A white notepad is pinned to a background of scattered 3D numbers. The notepad is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface.
$$451 - 187 = ?$$




$$451 - 187 = ?$$

$$187 + 3 =$$


$$451 - 187 = ?$$

$$187 + 3 = 190$$

$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} =$$


$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$200 + \mathbf{251} =$$

$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$200 + \mathbf{251} = 451$$

$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$200 + \mathbf{251} = 451$$

$$\mathbf{3} + \mathbf{10} + \mathbf{251} =$$

$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$200 + \mathbf{251} = 451$$

$$\mathbf{3} + \mathbf{10} + \mathbf{251} = \mathbf{264}$$



$$451 - 187 = ?$$

$$187 + \mathbf{3} = 190$$

$$190 + \mathbf{10} = 200$$

$$200 + \mathbf{251} = 451$$

$$\mathbf{3} + \mathbf{10} + \mathbf{251} = \mathbf{264}$$

$$451 - 187 = \mathbf{264}$$

A white rectangular card is pinned to a background of scattered 3D letters. The card is held in place by two silver pushpins at the top corners. The background consists of numerous white, three-dimensional letters of various sizes and orientations, creating a textured, abstract pattern. The word "Obgryzanie" is written in a bold, dark blue font in the center of the card.

**Obgryzanie**


$$451 - 187 = ?$$

A white notepad is pinned to a background of scattered 3D numbers. The notepad is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface.
$$451 - 187 = ?$$


$$451 - 187 = ?$$

$$451 - 51 =$$


$$451 - 187 = ?$$

$$451 - 51 = 400$$

$$451 - 187 = ?$$

$$451 - \mathbf{51} = 400$$

$$400 - \mathbf{200} =$$


$$451 - 187 = ?$$

$$451 - \mathbf{51} = 400$$

$$400 - \mathbf{200} = 200$$



$$451 - 187 = ?$$

$$451 - \mathbf{51} = 400$$

$$400 - \mathbf{200} = 200$$

$$200 - \mathbf{13} =$$

$$451 - 187 = ?$$

$$451 - \mathbf{51} = 400$$

$$400 - \mathbf{200} = 200$$

$$200 - \mathbf{13} = \underline{187}$$

$$451 - 187 = ?$$

$$451 - \mathbf{51} = 400$$

$$400 - \mathbf{200} = 200$$

$$200 - \mathbf{13} = \underline{187}$$

$$\mathbf{51} + \mathbf{200} + \mathbf{13} =$$

$$451 - 187 = ?$$

$$451 - 51 = 400$$

$$400 - 200 = 200$$

$$200 - 13 = \underline{187}$$

$$51 + 200 + 13 = 264$$

$$451 - 187 = 264$$

A white rectangular card is pinned to a background of scattered 3D letters. The card is held in place by two silver pushpins at the top corners. The word "Tabelka" is written in the center of the card in a bold, dark blue font. The background consists of numerous 3D letters in various shades of gray and white, scattered across the surface.

**Tabelka**

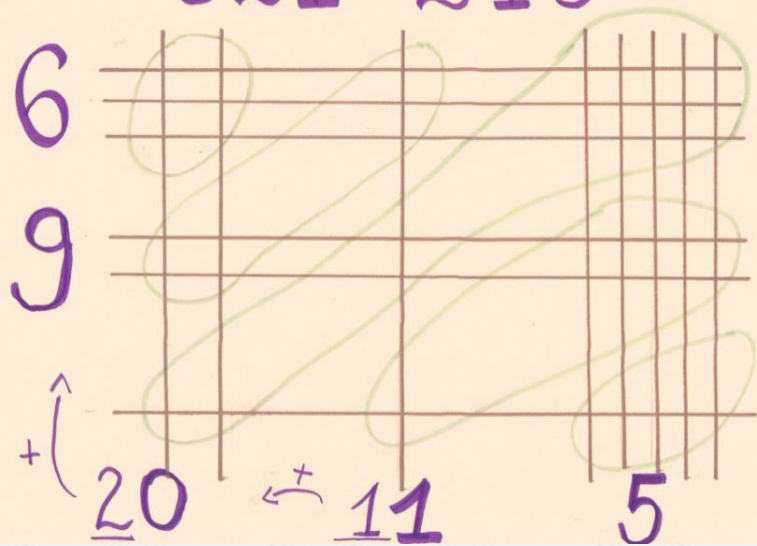
	3	1	2	.
1	1/5	0/5	1/0	5
5	0/0	0/0	0/0	0
7	1/8	0/6	1/2	6
	8	7	2	

	2	3	.
1	1/4	2/1	7
6	0/0	0/0	0
1	0/8	1/2	4
	9	2	

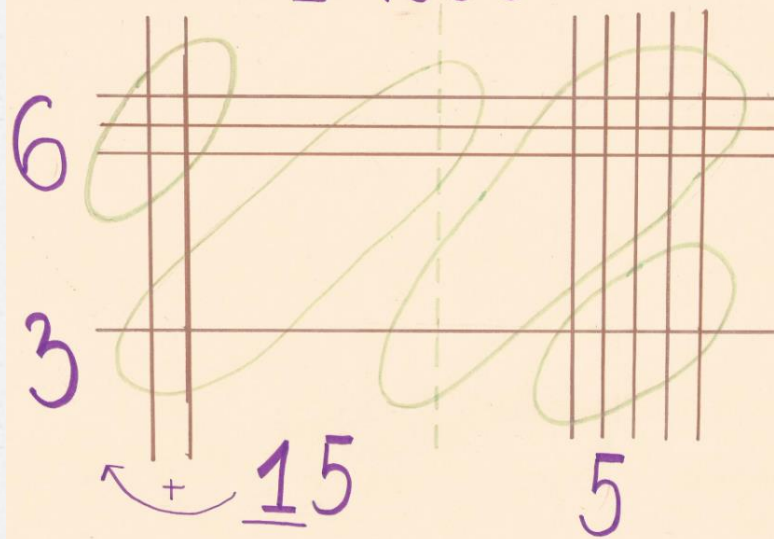
A white rectangular card is pinned to a background of scattered 3D letters. The card is centered and contains the word "Kreski" in a blue, sans-serif font. The background consists of various letters and numbers in a light blue-grey color, scattered across the surface. Two silver pushpins are visible at the top corners of the card.

**Kreski**

$$321 \cdot 215$$




$$31 \cdot 205$$





## Rada 4.

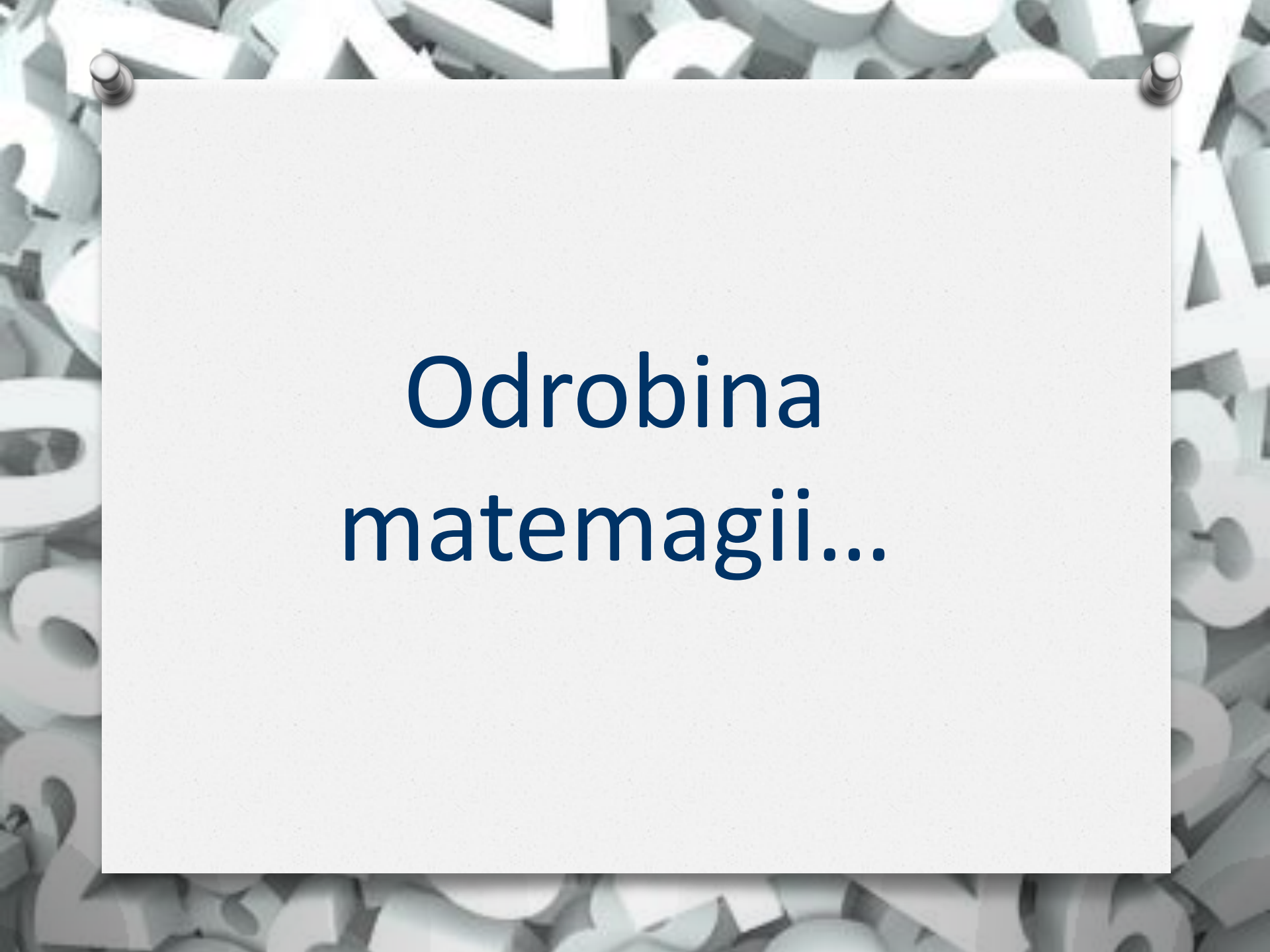
Wykonuj działania w pamięci  
od lewej strony


$$325 + 143$$

## Rada 5.

# Ćwiczenie czyni mistrza





Odrobina  
matemagii...

A white rectangular card is pinned to a background of scattered 3D numbers. The card is held in place by two silver pushpins at the top corners. The background consists of various numbers (0-9) in a light blue-grey color, scattered across the surface. The card is blank except for the text.

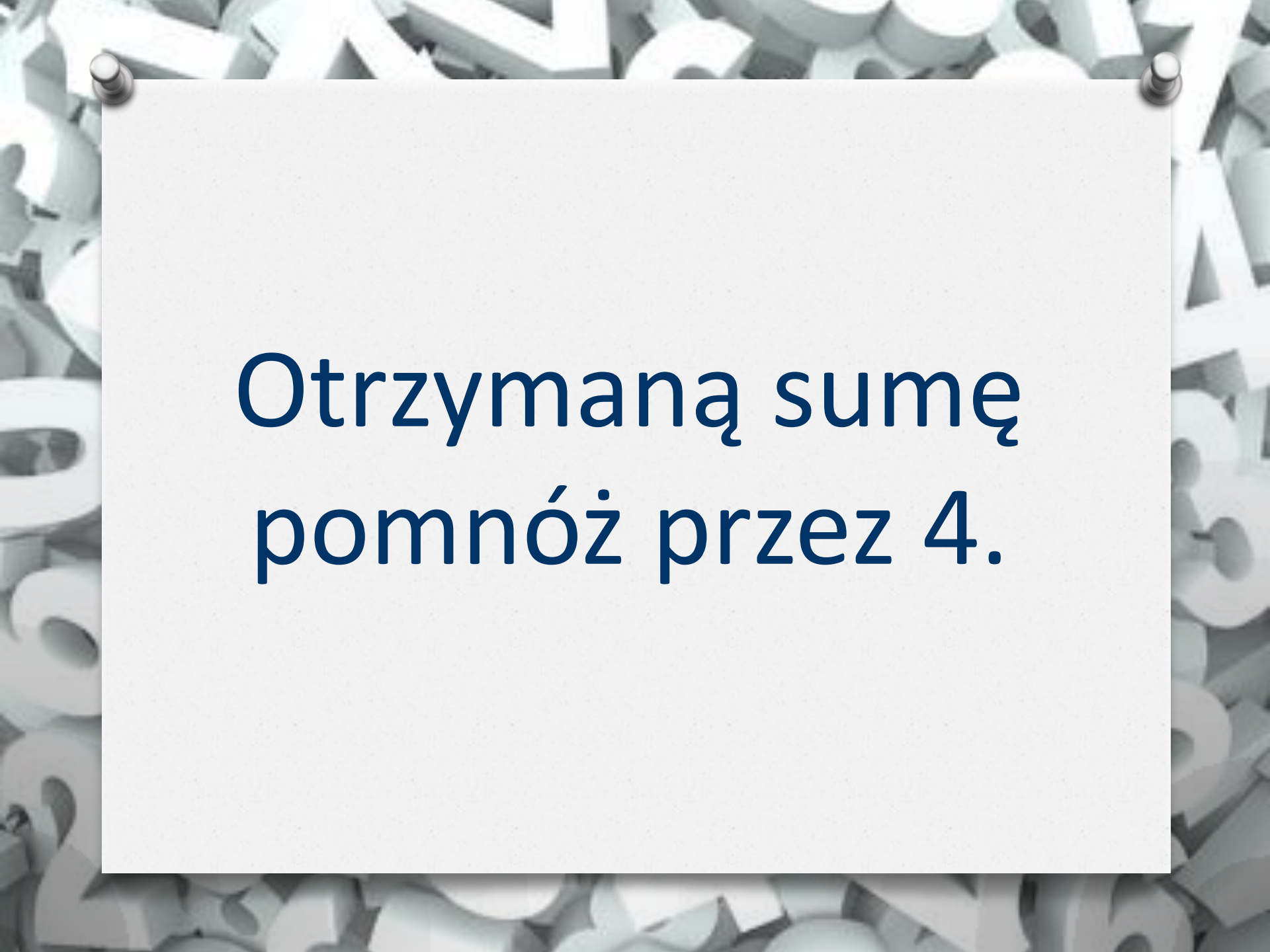
Pomyśl jakąś liczbę.



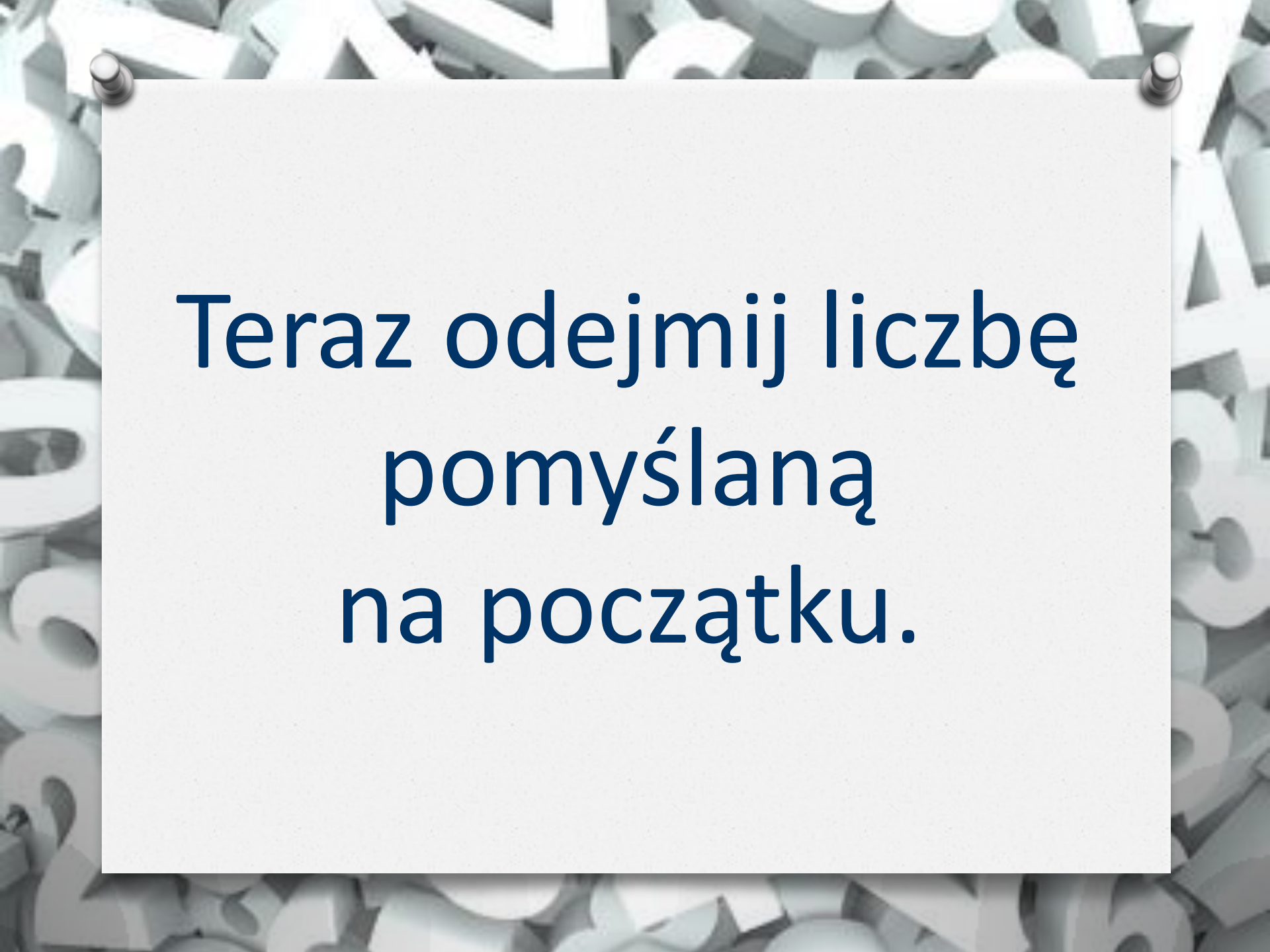
Podziel ją przez 2,  
pomijając resztę.

A white rectangular card is pinned to a background of scattered 3D letters. The card is held in place by two silver pushpins at the top corners. The background consists of various letters and numbers in a light blue-grey color, scattered across the surface.

**Dodaj 1.**



Otrzymałą sumę  
pomnóż przez 4.



Teraz odejmij liczbę  
pomyślaną  
na początku.



**MATEMAGIA!**





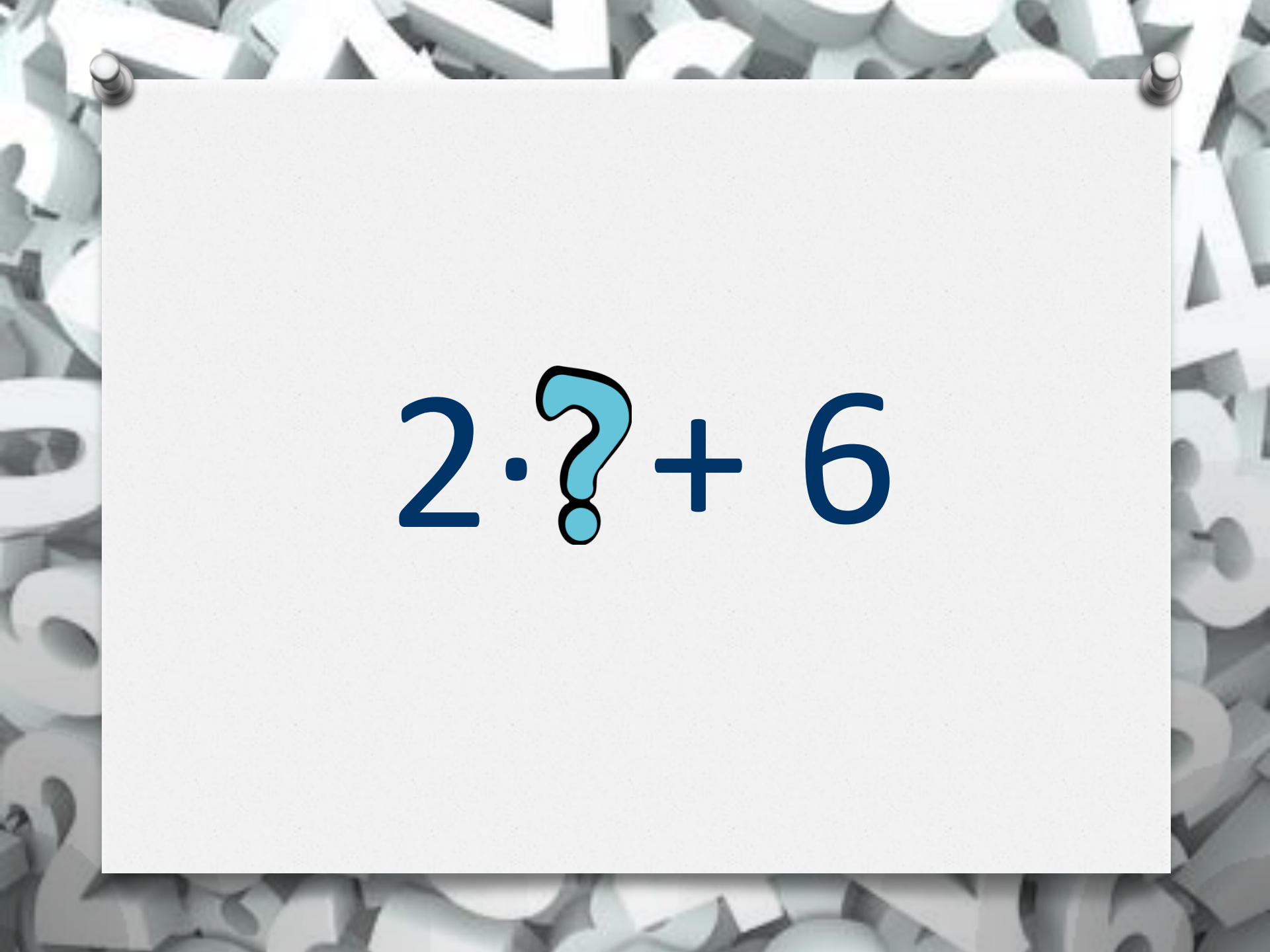
**Przepis  
na sztuczkę  
matemagiczną**





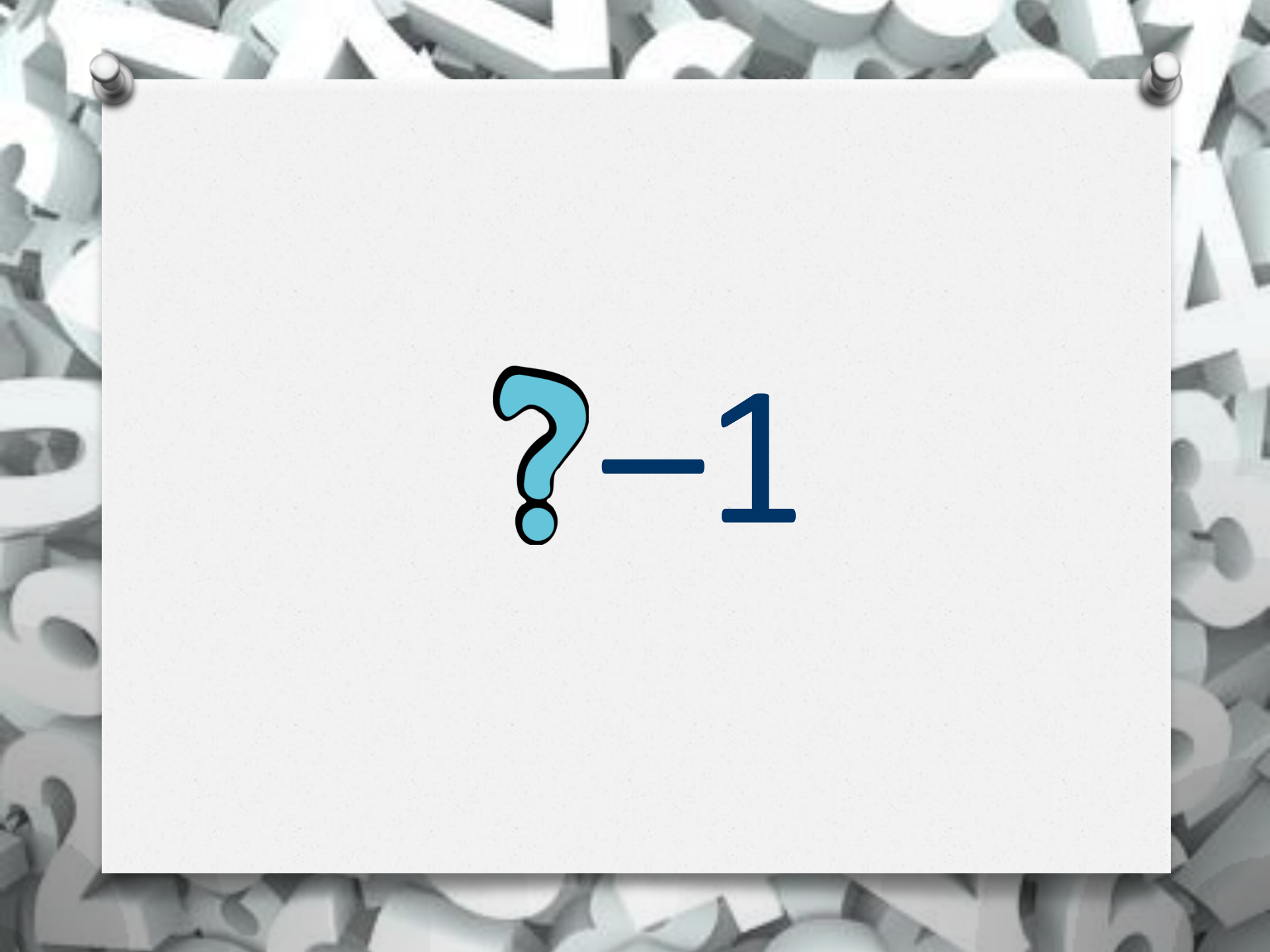
? + 3


$$? + 3 + ? + 3$$


$$2 \cdot ? + 6$$



2 · ? - 1



?-1



A white rectangular card is pinned to a background of scattered 3D letters. The card is held in place by two silver pushpins at the top corners. The background consists of numerous white, three-dimensional letters of various sizes and orientations, creating a textured, abstract pattern. The lighting is soft, casting gentle shadows on the letters and the card.

**Kto liczy najszybciej?**



Arthur Benjamin

film



Naofumi Ogasawara

film



Rüdiger Gamm

film

MARKUSZ GABRYEL WĘCISKO

# Błyskawiczny kurs liczenia w pamięci

SZYBKO, ŁATWO, SKUTECZNIE

System liczenia w 10 minut!  
Ciepłe ćwiczenia i skuteczne techniki  
Lubisz liczyć? To spróbuj tej książki!

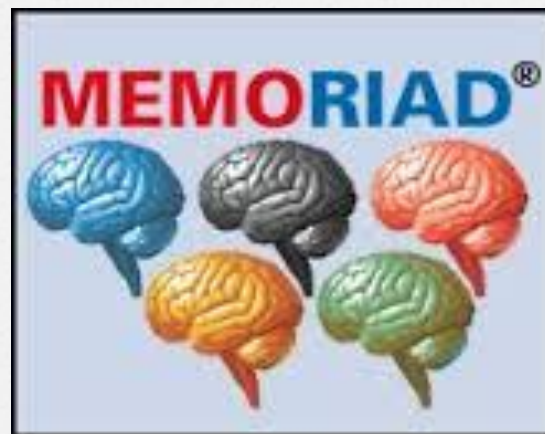
$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$



Arthur Benjamin  
Michael Shermer



# Memoriada, Turcija 2013



**film**

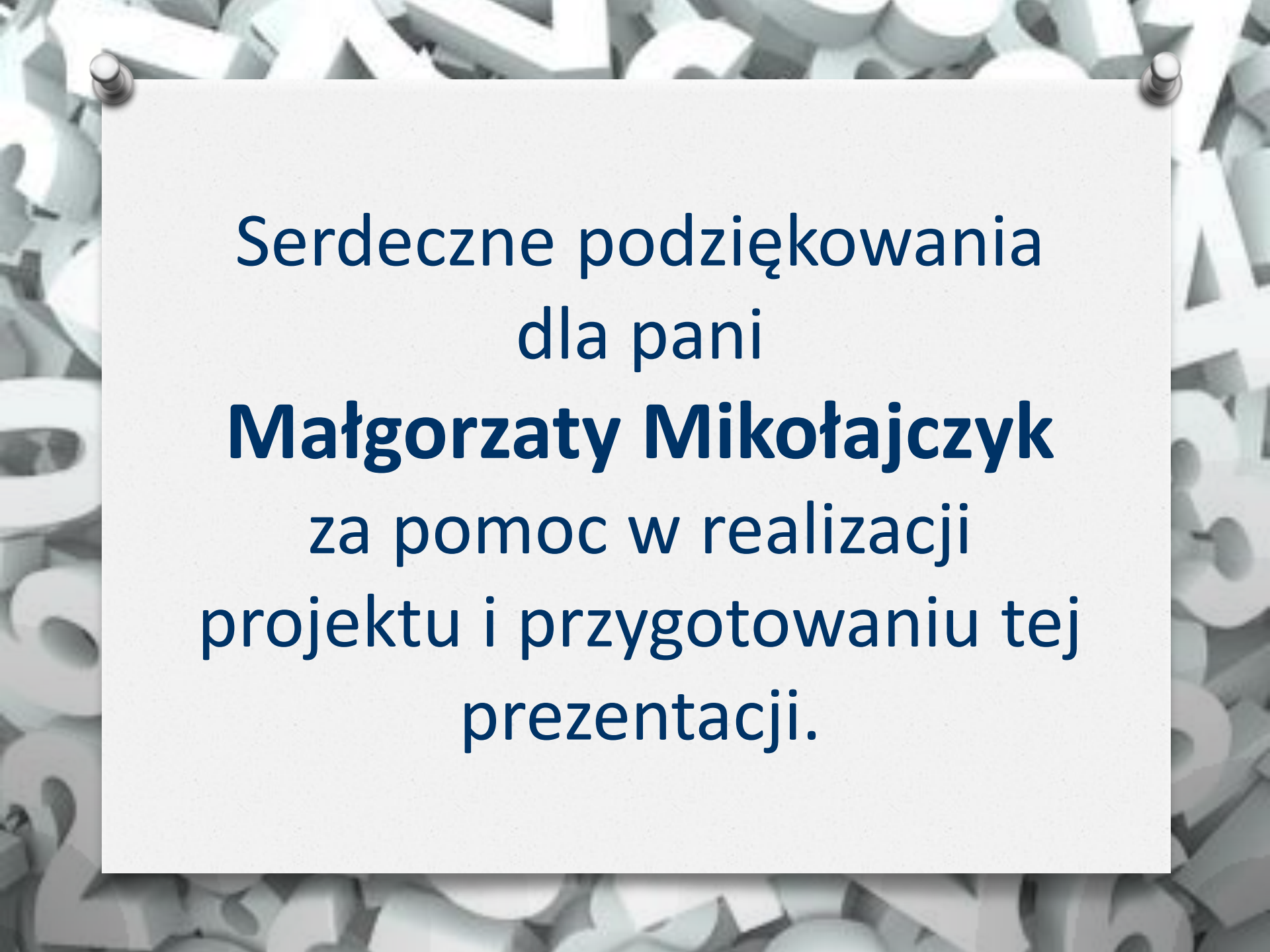
## Filmy wykorzystane w prezentacji można znaleźć pod adresami:

1. Arthur Benjamin  
<https://www.youtube.com/watch?v=e4PTvXtz4GM>
2. Naofumi Ogasawara  
<https://www.youtube.com/watch?v=rPTKZ4PLkMc>
3. Rüdiger Gamm  
<http://www.cda.pl/video/8641315/Supermozg-czlowiek-kalkulator>
4. Memoriada  
<https://www.youtube.com/watch?v=Oj04e0buZvw>

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**A kto z Was liczy  
najszybciej?**

1. Pomnóż 88 przez 96.
2. Następnie podziel ten iloczyn przez 4.
3. Od otrzymanego wyniku odejmij 112.



Serdeczne podziękowania  
dla pani  
**Małgorzaty Mikołajczyk**  
za pomoc w realizacji  
projektu i przygotowaniu tej  
prezentacji.





**Dziękujemy  
za uwagę!**