



# **Changing the way we count from 0 to 100 using every Math operation you know**

Invented By

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# MathNatics

## Changing the way we count from 0 to 100 using every Math operation you know

Imagine a game that makes Math exciting and fun! That's exactly what this awesome father-and-son duo created with **MathNatics** — a game where you use Math to play, compete, and challenge yourself.

It all started during long road trips in 2024. To pass the time, Alan and Julian looked for car license plates with numbers divisible by 11. But that got boring fast. So, they came up with a new challenge: using the digits on a random license plate and all the math skills they knew to count from 0 to 100! Could they add, subtract, multiply, divide, and get creative with numbers to make each step in the count?

That idea became **MathNatics** — a game where you use everything from basic math to tricky operations like square roots, exponents, and even trigonometry! You can move numbers around, group them together, and find clever ways to reach your goal.

They named it **MathNatics** because it's like gymnastics for your brain—flipping, twisting, and stretching numbers in amazing ways. After a year of testing, it was time to share it with everyone. Now, you can play too! Check out the rules, grab some numbers, and start your own adventure in counting from 0 to 100 using the power of math!

## Basic Game Rules

1. **No Writing Allowed** – This is a memory game! You do all the math in your head. Young players can use paper if needed.
2. **Pick 4 Digits** – Choose four random digits (0-9) from a hat, or have players randomly choose, or even pick numbers from a car's license plate during a road trip; ignore the letters — only numbers matter!



Example: Your digits might be **3, 1, 2, 3** from a license plate.

3. **Use Each Digit Only Once** – If a digit repeats, you can use it as many times as it appears.

4. **All Math Operations Allowed** – You can add, subtract, multiply, divide, and use special math tricks like exponents, roots, trigonometry, Tetration, Permutation and more.

Addition	+	Multiplication	×	Nth-Root	$n\sqrt{\#}$
Subtraction	-	Division	÷	Factorial	!
Modulus	%	Quotient	//	Exponent	** or ^
Cosine	Cos ()	Sine	Sin ()	Tangent	Tan ()
Round Up	Ceiling ()	Round Down	Floor()	Average	Avg {}
Permutation	nPr	Combination	nCr	Tetration	↑↑
Logarithm	Log (x)	Determinant	A	Typecast	(INT) x

**Notes:**

**Nth-Root Calculation:** You may compute any root (e.g., square root, cube root, fourth root) of a number using the available set of digits. However, the root itself (n) does not need to be a part of the set. For example, you can find the cube root of a number without requiring the digit 3 in the original set.

**Averaging Digits:** When calculating the average of a set of digits, the denominator used in the division does not need to be part of the set. For example, given the digits {3,1,2,3}, the average is:  $(3+1+2+3)/4 = 9/4 = 2.25$   
Here, 4 is used in the division but does not belong to the original set of digits.

5. **Combine Digits to Make Bigger Numbers** – You can rearrange digits to form new numbers: Combine digits to form new numbers using the join symbol *j*. **1j3 = 13, 3j1j2 = 312, or 2j3 = 23.**
6. **Keep Counting from 0 to 100** – Use math to reach the next number in the sequence. The game ends when no one can continue.
7. **Ratings** – Your highest number reached becomes your **MathNatic Rating (MR-#)**
- **Beginner:** MR-20 or below
  - **Intermediate:** Up to MR-50
  - **Proficient:** Up to MR-80
  - **Master:** Up to MR-100
  - **Wizard:** More than MR-100!

The challenge? Reach as high as possible using only math and your chosen digits! Ready to test your skills?

# Example Play



**MathNatic Digits: 3 1 2 3**

$$0 = 3-3$$

$$1 = 1$$

$$2 = 2$$

$$3 = 3$$

$$4 = 1+3$$

$$5 = 2+3$$

$$6 = 3+3$$

$$7 = 1+3+3$$

$$8 = 2+3+3$$

$$9 = 3 \times 3$$

$$10 = 1+3 \times 3$$

$$11 = 2+3 \times 3$$

$$12 = 3+3^2 \text{ or piece together 1 and 2 to get 12}$$

$$13 = 13$$

$$14 = 3-2 = 1. 1+3 = 4. \text{ Join 1 and 4} = 1j4 = 14. \text{ When count is 41, use } 4j1 = 41$$

$$15 = 1 j (2+3) = 1j5 = 15. \text{ When count is 51, use } 5j1 = 51$$

$$16 = 1 j (2 \times 3) = 1j6 = 16. \text{ When count is 61, use } 6j1 = 61$$

.

.

**MathNatic Digits: 5 0 7 8**

Other cool operations include:

$$\cos(0) = 1$$

$$7^0 = 1$$

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

$$87\%50 = 37$$

# Ways to Play MathNatics

**MathNatics** is a versatile game that can be played solo or in groups, making it perfect for families or classroom settings. With customizable house rules and point systems, players can tailor the experience to suit different skill levels and competitive dynamics.

## How to Play & Score Points

- **Basic Scoring:** Every correct math solution to a count is worth **1 point**.
- **Bonus Points:** Players get extra points if they show different ways to solve the same problem. Example: If a team finds **3 different ways** to reach a number, they earn **3 points**.
- **Winning the Game:**

The team with the **highest MR-# (MathNatic Rating)** wins.

If there's a tie, the team with **the most points** wins.

House rules can let **total points** decide the winner instead of **MR-#**.

## Fun Extras

### Earning Points in Different Ways

- **Point System:** Harder numbers are worth more points.  
Prime numbers earn **2 points**, even numbers earn **1 point**.
- **Combos:** Players can earn extra points by using different math tricks.  
Example: If a count has **5 different solutions**, it gets **5 points**.
- **Challenge Cards:** Special cards add tricky math problems.  
Example: Teams may have a limit on which math operations they can use.
- **Wild Numbers:** Teams can swap out numbers to make problems easier.  
Example: Skip numbers that are **multiples of 5** or swap out a digit from the set of MathNatic numbers.

## Learning While You Play

- **Explain Your Moves:** Players can explain their math thinking to earn bonus points. This is great for classrooms.
- **Mini Math Quests:** Fun math challenges that teach new skills.  
Example: Teachers can choose special rules based on a lesson.
- **Daily Challenges:** A new puzzle every day keeps players thinking!  
Example: Start the day with a **quick MathNatics problem**, add a time limit, and reward teams that use the most math tricks.

## Key Benefits of MathNatics

- **Improves Number Fluency:** Helps players recognize number patterns and develop quick calculation skills.
- **Strengthens Problem-Solving:** Encourages logical thinking and creativity beyond simple memorization.
- **Connects to Real-World Math:** Introduces useful concepts like percentages, factorials, and modular arithmetic in an interactive way.
- **Adaptable for All Skill Levels:** Designed for elementary students, teens, and even adults who love math challenges.

## Ways to Engage with MathNatics

- **Start a MathNatics Club** – Gather friends or classmates to celebrate the fun of math! Sign up for daily MathNatic Digits at **MathNatics.org** or follow MathNatic on Instagram to share your **MR-#** and creative solutions.
- **Download the MathNatics App** – Available on Google Play and the Apple Store, this app lets MathNaticians (dedicated math lovers) explore interactive ways to count from 0 to 100.
- **Play the MathNatics Board Game** – Perfect for family game nights, this exciting math challenge is available online for everyone to enjoy.

## How You Can Help

We are seeking educators, game developers, and partners to help bring MathNatics to life! Here's how you can get involved:

- ✓ Educators: Test MathNatics in classrooms as an engaging learning tool.
- ✓ Developers: Help us build a digital or interactive version.
- ✓ Supporters: Join us in expanding MathNatics through crowdfunding, collaboration, or publishing.

Together, we can turn math into an exciting adventure that inspires curiosity and confidence!

## Contact Us

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## About Us

Julian is passionate about math, programming, chess, and table tennis—and holds a black belt in Taekwondo. A true foodie, he enjoys making spicy noodles. One of his favorite MathNatics solutions was solving the count **59** using the digits **7, 8, 4, and 0** with the equation:  $(7 \times 8) + 4 - \cos(0)$ .

Alan is a Structural Engineer and Principal Software Engineer at Bentley Systems. He holds bachelor's degrees in Mathematics, Computer Science, and Civil Engineering, along with a PhD in Structural Engineering. In his free time, he loves road-tripping across California with Julian and his wife, Irma.

We are passionate about sharing our love for math with kids around the world. We hope MathNatics challenges you and brings you the same excitement and satisfaction we feel when discovering solutions that get us closer to 100!