Number Triangles:

Pascal's Triangle & Teardrop Number Triangle

By Glen Ritchie

April 07, 2026

1

1

Introduction

- Why study Number Triangles?
- What do I hope to show you, today?
- Terminology
- Pascal's Triangle Patterns
- Teardrop Number Triangle
- Show Value of On-Line Encyclopedia of Integer Sequences (OEIS)
- Introduction to Git & GitHub
- Introduction to NTA2 Application

2

2

Terminology

- Pascal's Triangle
- Number Triangle
- Sequences
- OEIS
- NTA2: Number Triangle Application

3

3

Personal Terminology

- NT Diagonal
- NT Row
- Rising Shallow Diagonal (Sum) RSD
- Falling Shallow Diagonal (Sum) FSD
- Row Sum RS
- Teardrop Number Triangle (NT)

4

4

NT Possible Meanings

- New Testament
- Number Theory
- Number Triangle
- Northern Territory of Australia
- Not (nt)
- Nucleotides
- Nice Try

5

5

Advanced Terminology

- Generating functions
- Fibonacci Polynomials
- Riordan Arrays

6

6

Part I: Pascal's Triangle

7

7

Pascal's Triangle

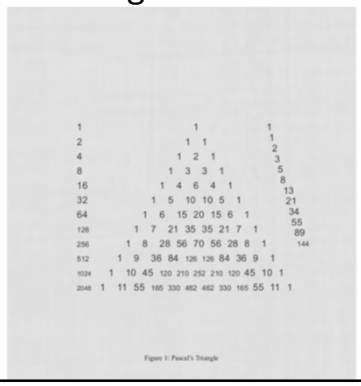


Figure 1: Pascal's Triangle

8

8

Fig. 1

Pascal's Labeled Triangle

Figure 2: Pascal's Labeled Triangle

9

9

Fig. 2

Sequences Inside Pascal's Triangle

- Natural numbers (directly)
- Triangular numbers (directly)
- Tetrahedral numbers (directly)
- Pentatope numbers (directly)
- Figurate numbers
- Fibonacci numbers
- Pell numbers
- Square numbers
- Cube numbers
- π

10

10

Number Triangle Alignments

Fig. 4

Figure 4: Number Triangle Alignments

11

11

RSD Illustration Diagram

Fig. 3

Figure 3: RSD Illustration Diagram

12

12

Part II: Teardrop Triangle

13

13

Teardrop Number Triangle

- How did my Quest begin?
- Curiosity.
- It is commonly known. Pascal's Triangle has Fibonacci numbers as its RSD sums.
- I asked myself. What if?
- There was a Number Triangle which the Triangular numbers were the result of RSD sums?
- Searching the Internet. No one has heard of it. Although, if you attempt it. It isn't hard to find.
- Here it is! I call it the Teardrop number triangle.

14

14

Teardrop Number Triangle

Fig. 8

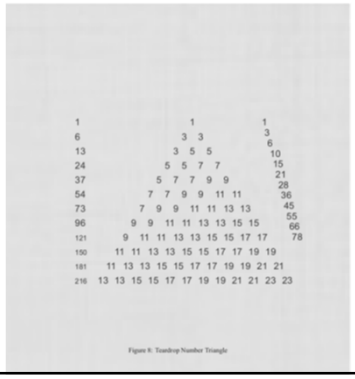


Figure 8: Teardrop Number Triangle

15

15

Teardrop RSD Illustration Diagram

Fig. 9

16

16

Reveal Ways of Teardrop Triangle

Fig. 10

17

17

Part III: Tools

18

18

OEIS Website

- On-line database of integer sequences
- Database Size & Growth
  - Over 399,000 sequences (as of April 2026)
  - Widely cited by professional and amateur mathematicians
- Entry Features
  - Leading terms of each sequence
  - Keywords and mathematical motivations
  - Literature references and links
- Search Capabilities
  - Search by subsequence

19

19

Git Tool

- What Git Is
  - Distributed version control system for managing source code and data versions (free)
  - Enables collaborative software development among programmers
- How It Works
  - Maintains complete local repository copy on each computer
  - Includes full history and version-tracking capabilities
  - Works independently without network access or central server

20

20

GitHub Website

- What GitHub Is
  - Developer platform for code management (free)
  - Built on Git for distributed version control
- Key Features
  - Access control and bug tracking
- Primary Use
  - Hosts open-source software projects
  - Stores source code with full revision control

21

21

NTA2 Application

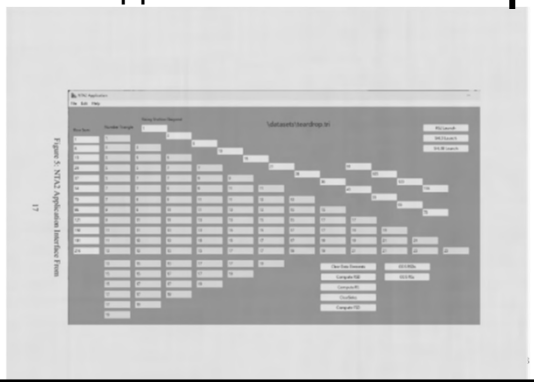
- Custom Windows Application
- Produced with Lazarus IDE
- Supports Clipboard Exchange
- Dataset Saving & Loading in Plain Text
- RSD, (FSD), & RS Sums Computation
- Open Source Software (OSS) Licensed

22

22

NTA2 Application

Fig. 5



23

References

- On-Line Encyclopedia of Integer Sequences, Neil Sloane (Present)
- Triangular Arrays with Applications, Thomas Koshy (2011)
- The Art of Computer Programming (TAOCP), Don Knuth (1997)
- Concrete Mathematics: Graham, Knuth, Patashnik (1989)
- Handbook of Mathematical Functions, Abramowitz and Stegun (1972)
- VNR Concise Encyclopedia of Mathematics (1975)
- The LaTeX Companion, Grossman
- Wikipedia
- MathWorld
- Perplexity AI

24

24

Thank You

- Math Club, University of Mary
- Thomas King
- Mark Stotzer
- Mary Smyth
- James Gustafson
- Travis Wolf
- Duane Hinsz
- Paper Online at https://gcdr.github.io, Academia post.

25

25