How to Explore Collatz-6

1. Compute Orbits

Choose any integer n and repeatedly apply the Collatz-6 map.
Track each step, record n mod 6, and note when 7n ± 1 occurs.
Check the value of v6 at every jump.
Even small numbers reveal the structure of the 6-adic world.

2. Watch the Chaos Rim

The classes n ≡ 1 or 5 (mod 6) form the **Chaos Rim**.
This is where 7n ± 1 jumps occur.
Key observations:
  - How often does the orbit return to the Chaos Rim
  - How long does it stay in the division layers (0,2,3,4)
  - Does the orbit drift upward or collapse downward

Frequent returns to the Chaos Rim indicate glider-like behavior.

3. Detect Pure Jumps (v6 = 0)

A pure jump occurs when v6(7n ± 1) = 0.
Then T(n) = 7n ± 1 with no division.
Pure jumps cause sharp growth and are essential for gliders.
Finding numbers that produce pure jumps is a central challenge.

4. Search for Gliders

A glider is an orbit that:
  - repeatedly enters n ≡ 1 or 5 (mod 6)
  - triggers many 7n ± 1 jumps
  - shows multiple pure jumps
  - avoids long division sequences
  - grows instead of converging

To test for glider behavior, examine:
  - the long-term growth of the orbit
  - the ratio of jumps to divisions
  - the frequency of returns to the Chaos Rim

5. Explore Fibonacci Numbers

Fibonacci numbers often satisfy F_n ≡ 1 or 5 (mod 6).
They naturally fall on the Chaos Rim and trigger many jumps.
However, for F_1–F_{20}, no pure jump has been observed.
Finding the first Fibonacci number with v6 = 0 remains an open problem.

6. Investigate Escape Candidates

Some numbers show long upward drift with few divisions.
The strongest known example is **20737**,
which repeatedly returns to the Chaos Rim and grows persistently.
Track such numbers for thousands of steps and observe whether the orbit continues to rise.

7. Build Simple Tools

Small programs can reveal deep structure.
Useful tools include:
- an orbit generator
- a v6 calculator
- a jump/division counter
- a Chaos Rim detector
- a growth-rate analyzer

Even minimal scripts can uncover new patterns.

8. Share Your Findings

Collatz-6 is a new mathematical world.
Every orbit, anomaly, or pattern contributes to the exploration.
Interesting results include:
- numbers with pure jumps
- long glider-like trajectories
- new escape candidates
- Fibonacci behavior
- statistical patterns in v6

Exploration begins with your experiments.

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