

# Good proofs are:

---

1. correct
2. complete
3. clear
4. brief
5. "elegant"
6. well-organized
7. in order

## Fermat's Last Thm:

$$\forall n > 2, \neg \exists x, y, z \in \mathbb{N}^+ \\ x^n + y^n = z^n$$

**Problem:** Find a sequence of moves to go from

A	B	C
D	E	F
H	G	

to

A	B	C
D	E	F
G	H	

**Legal Move:** Slide a letter into a adjacent blank square.

**Thm:** There is no sequence of legal moves to invert G&H and return all other letters to their original position.

## Natural Order

1	2	3
4	5	6
7	8	9

## Row move

**Ex:**

A	B	C
D	G	
E	F	H

 $\Rightarrow$ 

A	B	C
D		G
E	F	H

**Lemma 1: A row move does not change the order of the items.**

**Proof: Obvious.** In a row move, we move an item from cell  $i$  into an adjacent cell  $i-1$  or  $i+1$ . Nothing else moves. Hence the order of items is preserved.  $\square$