

1. Here is a claim:

Claim 1 (Twin primes conjecture) — There are infinitely many primes that are two apart.

Proof. The proof is left as an exercise for the interested reader. \square

2. Here is a lemma:

Lemma 1 (Johnson-Lindenstrauss '84) — A set of n points in high dimensional Euclidean space can be mapped into an $O(\log n/\varepsilon^2)$ -dimensional Euclidean space such that the distance between any two points changes by only a factor of $(1 \pm \varepsilon)$.

Proof. The proof is left as an exercise for the interested reader. \square

3. Here is a remark:

Remark 1 (Sexy primes conjecture) — There are infinitely many primes that are six apart.

Proof. The proof is left as an exercise for the interested reader. \square

4. Here is a corollary:

Corollary 1 (Cousin primes conjecture) — There are infinitely many primes that are four apart.

Proof. The proof is left as an exercise for the interested reader. \square

5. Here is a theorem:

Theorem 1 (Pythagorean theorem) — For any right-triangle the square of the hypotenuse is equal to the sum of squares of the other two sides.

Proof. The proof is left as an exercise for the interested reader. \square

6. Here is a proposition based off **Theorem 1**:

Proposition 1 (Fermat's Last Theorem) — $a^n + b^n \neq c^n$ for any choices of $n > 2$.

Proof. I have a truly marvelous demonstration of this proposition that this margin is too narrow to contain. \square

7. Here is a definition:

Definition 1 — Let $G = (V, E)$ be an undirected graph with edge-weights given by $w: E \rightarrow \mathbb{R}$. Assume that $w(e) \neq w(f)$ whenever e, f are distinct edges of G . We say that an edge is *treacherous* if it is the maximum weight edge of some cycle of G . On the other hand, an edge is *reliable* if it is not contained in any cycle of G .