

CompSci 161

Winter 2023 Lecture 2:

Prerequisite Review: Proofs

2 Direct Proof

Prove: If n is odd, then n^2 is odd.

n is odd

So $\exists k \in \mathbb{Z} \quad n = 2k + 1$

So $n^2 = (2k+1)^2 = 4k^2 + 4k + 1$

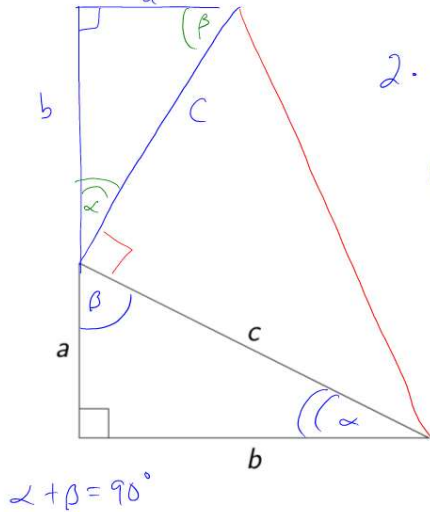
Let $j = 2k^2 + 2k$ // and note, $j \in \mathbb{Z}$

$n^2 = 2j + 1$

So n^2 is odd

□

3 Pythagorean theorem



$$2 \cdot \frac{1}{2} a \cdot b + \frac{1}{2} c^2 = \frac{1}{2} (a+b) (a+b)$$

$$ab + \frac{1}{2} c^2 = \frac{1}{2} (a^2 + 2ab + b^2)$$

$$\cancel{ab} + \frac{1}{2} c^2 = \frac{1}{2} a^2 + \cancel{ab} + \frac{1}{2} b^2$$

$$c^2 = a^2 + b^2$$

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Primitive Pythagorean Triplets

- We have a Pythagorean Triplet a, b, c
- Full credit: a, b cannot both be odd
- Partial credit: a, b cannot both be even

Friday! 😊