

## THEOREMS &amp; CONJECTURES

**Fermat's Last Theorem** No positive integers  $a, b, c$  satisfy the equation:

$$a^n + b^n = c^n$$

for any integer  $n$  greater than 2.

**Goldbach's Conjecture** Every even integer greater than 2 can be expressed as a sum of two primes.

**Pythagorean Theorem** In a right triangle the square of the hypotenuse is equal to the sum of the squares of the remaining sides.

## CONDITIONAL STATEMENTS

1. Let  $x \in \mathbb{Z}$ . Prove that if  $7x + 9$  is even, then  $x$  is odd.
2. Let  $x \in \mathbb{Z}$ . Prove that if  $x^2 - 6x + 5$  is even, then  $x$  is odd.
3. Let  $x, y \in \mathbb{R}$ . Prove that if  $y^3 + yx^2 \leq x^3 + xy^2$  then  $y \leq x$ .