

Theorem: All non-degenerate triangles with integer side lengths and perimeter 10 are isosceles.

Proof:


Brute force listing (Case-by-case analysis.)

When listing all cases it is very important to list systematically.

Let's list according to length of the largest side of the triangle.

length of largest side	Possible Triangles	isosceles?
1	\emptyset	
2	\emptyset	
3	\emptyset	
4	4- <u>3</u> - <u>3</u>	✓
	<u>4</u> - <u>4</u> -2	✓
5	5-1-4 <small>not</small> 5-2-3 <small>not</small> 5-3-2 <small>not</small> 5-4-1 <small>not</small> 5-5-0 <small>X</small>	
≥ 6	6- \emptyset	

We're done

mark  to indicate a proof well-done.

Steps for proofs

1. Understand the statement of the theorem - going back to the definitions.
2. Get your hands dirty by trying examples + more examples