

1 Theorem and lemma examples with title

Theorem 1.1: Pythagoras' theorem

In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the catheti.

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

In mathematics, the Pythagorean theorem, also known as Pythagoras' theorem (see theorem ??), is a relation in Euclidean geometry among the three sides of a right triangle.

Lemma 1.1: Bézout's identity

Let a and b be nonzero integers and let d be their greatest common divisor. Then there exist integers x and y such that:

$$ax + by = d$$

This is a reference to Bezout's lemma ??

2 Theorem and proof examples without title

Theorem 2.1

There exist two irrational numbers x , y such that x^y is rational.

Proof 2.1

If $x = y = \sqrt{2}$ is an example, then we are done; otherwise $\sqrt{2}^{\sqrt{2}}$ is irrational, in which case taking $x = \sqrt{2}^{\sqrt{2}}$ and $y = \sqrt{2}$ gives us:

$$\left(\sqrt{2}^{\sqrt{2}}\right)^{\sqrt{2}} = \sqrt{2}^{\sqrt{2}\sqrt{2}} = \sqrt{2}^2 = 2.$$

□