

# Sum of squares

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If  $a^2 + b^2 = x^2 + y^2$  (and  $a, b, x, y$  all not zero)

then I am 99% sure either  $a = x, b = y$  or  $a = y, b = x$ . But what makes this true, because it is clearly not true if we remove the squares:

$$2 + 5 = 1 + 6$$

Geometrically, of course,  $a^2 + b^2 = r$  is the equation of a circle. So if  $x^2 + y^2 = r$  as well, both equations represent the same circle.

But I would like a symbolic proof without appealing to geometry.

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