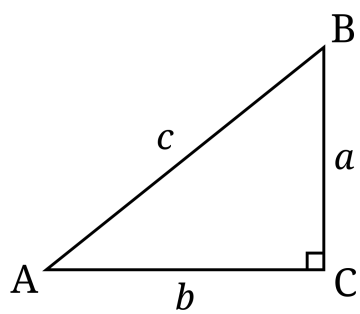
In geometry we first come across *square roots*. We learn that for a right-angled triangle ABC with sides BC, CA, AB of length a, b, c, AB of length c being the *hypotenuse*, the longest side which faces the right angle at C, we have Pythagoras's equation, $a^2 + b^2 = c^2$.



So, if length a is 3 and length b is 4, length c can be calculated. $a^2 + b^2$ is $3^2 + 4^2$, which is $9 + 16$, that is, 25. Since we know c^2 is 25, c must be its square root $\sqrt{25}$, which is 5.

Things may not be that simple. If for the same kind of triangle, we have a is 1 and b is 2, what is c? This time $a^2 + b^2$ is $1^2 + 2^2$, which is $1 + 4$, that is, 5. So c must be its square root $\sqrt{5}$. We cannot simplify further. Of course a calculator can show you what this number is—somewhere between 2 and 3.

Why? Because $2^2 = 4$ and $3^2 = 9$. If $c^2 = 5$ then c must be somewhere between 2 and 3, and perhaps a little closer to 2.

So $5 = c^2 = c \times c > 4 = 2 \times 2$. Geometrically, a square with sides of length 2 has area 4, so a square with area 5 must have sides little longer than 2.

So we have a geometrical demonstration of a property, not as famous as Pythagoras's equation: For two positive numbers, call them c and d, if $c^2 > d^2$, then $c > d$. Notice that there is nothing here about geometry, this is just a property of numbers. We will name this the **Square Root Property** (SRP in short).

For example, consider two positive whole numbers; call them a and b. If $a > b$, then $\sqrt{a} > \sqrt{b}$. A mathematician would say that $a > b$ is *sufficient* to show $\sqrt{a} > \sqrt{b}$. Since $5 > 4$ and $9 > 5$, these two conditions are sufficient to show $\sqrt{5} > 2$ and $3 > \sqrt{5}$, that is, $\sqrt{5}$ is between 2 and 3.

Mathematicians always like to extend what they know. So it was not long before a mathematician asked this question: if you have *four* positive whole numbers a, b, c, and d,