Square root

What side the square with the area of a m^2 does have? To solve this problem, we have to find the number, which gives us a as its square. In other words, we have to solve the equation

$$x^2 = a$$

There is a special sign for the arithmetic square root of a number a: $\sqrt{a}$.

Examples;

1. $\sqrt{25} = 5$, it means that arithmetic square root of 25 is 5, as a nonnegative number, square of which is 25.
2. Square root of 121 is 11
3. Square root of 2 is $\sqrt{2}$.
4. A few more:

$\sqrt{0} = 0$; $\qquad$ $\sqrt{1} = 1$; $\qquad$ $\sqrt{4} = 2$; $\qquad$ $\sqrt{9} = 3$; $\qquad$ $\sqrt{16} = 4$;

$\sqrt{25} = 5$; $\qquad$ $\sqrt{\dfrac{1}{64}} = \dfrac{1}{8}$; $\qquad$ $\sqrt{\dfrac{36}{25}} = \dfrac{6}{5}$

Pythagorean theorem

In a right triangle with legs a, b and hypotenuse c, one has:

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

$$\text{or } c = \sqrt{a^2 + b^2}$$

For example, in a square with side 1, the diagonal has length √2. It is possible — but not easy — to find a right triangle where all sides are whole numbers. The easiest such triangle is the triangle with sides 3, 4, 5.

Homework.

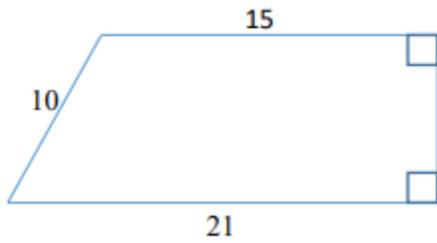1. Find the following square roots:

a) $\sqrt{91 + 9}$

b) $\sqrt{36} + \sqrt{49}$

c) $\sqrt{11^2}$

d) $\sqrt{0.81} - 2\sqrt{0.25}$

2. If, in a right triangle, one leg has length 1 and the hypotenuse has length 2, what is the other leg?

3. Find the height and area of the figure: Three sides are given and the two marked angles are right angles.

4. Can you find a right triangle where all sides are whole numbers and the hypotenuse is 13?