

YOU & MATHS Sums and squares Two numbers add up to -5 . The squares of the numbers add up to 53 . Find the two numbers.

Let x, y be the two numbers. We know that:

$$\begin{cases} x + y = -5 \\ x^2 + y^2 = 53 \end{cases}$$

Let us do some calculations:

$$\begin{cases} x = -y - 5 \\ (-y - 5)^2 + y^2 = 53 \end{cases} \rightarrow \begin{cases} x = -y - 5 \\ 2y^2 + 10y + 25 = 53 \end{cases} \rightarrow \begin{cases} x = -y - 5 \\ 2y^2 + 10y - 28 = 0 \end{cases}$$

The solutions of the equation $2y^2 + 10y - 28 = 0$ are:

$$y = 2 \text{ or } y = -7.$$

If $y = 2$, then $x = -y - 5 = -7$.

If $y = -7$, then $x = -y - 5 = 2$.

Therefore there is only one pair of numbers that solves the problem, and the two numbers are 2 and -7 .