Dr Oliver Mathematics
Worked Examples
Length 4

From: Cole's World of Mathematics, 15 February 2024

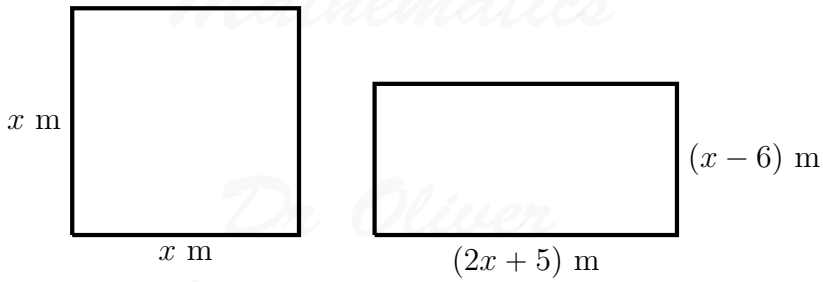
1. A square garden and a rectangular garden have the same area.

   - The length of the rectangular garden is five feet more than twice length the length of the side of the square garden.
   - The width of the rectangular garden is six feet less than the length of the side of the square garden.

   Find the length of the side of the square garden.

Solution

Let x m be the length of the side of the square garden.
We can picture this as follows: Then



Now, "square garden and a rectangular garden have the same area" so

$$(2x+5)(x-6) = x^2.$$

Next,

×	$2x$	$+5$
x	$2x^2$	$+5x$
-6	$-12x$	-30

so

$$\begin{aligned}(2x+5)(x-6) = x^2 &\Rightarrow 2x^2 - 7x - 30 = x^2 \\ &\Rightarrow x^2 - 7x - 30 = 0\end{aligned}$$

$$\left.\begin{array}{rr}\text{add to:} & -7 \\ \text{multiply to:} & -30\end{array}\right\} -10,\ +3$$

$$\begin{aligned}&\Rightarrow (x-10)(x+3)=0\\ &\Rightarrow x-10=0 \text{ or } x+3=0\\ &\Rightarrow x=10 \text{ or } x=-3.\end{aligned}$$

But $x \neq -3$ (as we are talking gardens!) so

$$\underline{\underline{x=10}}.$$