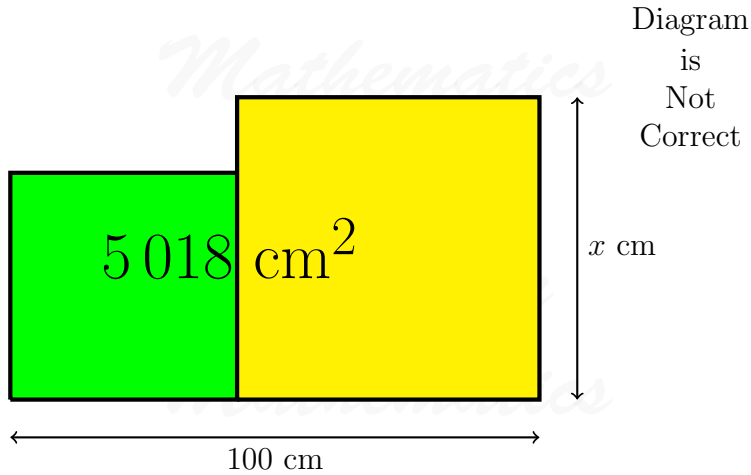# Dr Oliver Mathematics
Worked Examples
Length 3

From: PreMath 11 December 2023

1. Two squares — one green (the left-hand side) and one yellow (the right-hand side) — are lying, side-by-side, on a given line.

Diagram
is
Not
Correct

$5\,018$ cm^2

x cm

100 cm

- The horizontal length of both squares is 100 cm.
- The right-hand square has a height of x cm.
- The area of the yellow square is greater than the area of the green square.
- The total amount of area in both squares is $5\,018$ cm^2.

Find x.

Solution

$(100 - x)$ cm

$(100 - x)^2$ cm^2

x^2 cm^2

x cm

$(100 - x)$ cm

x cm

$$(100 - x)^2 + x^2 = 5\,018$$

$\times$	100	$-x$
100	$10\,000$	$-100x$
$-x$	$-100x$	$+x^2$

$$\Rightarrow \quad (10\,000 - 200x + x^2) + x^2 = 5\,018$$

we gather up the terms:

$$\Rightarrow \quad 2x^2 - 200x + 4\,982 = 0$$

we extract of common factor of 2:

$$\Rightarrow \quad 2(x^2 - 100x + 2\,491) = 0$$

we solve the quadratic equation, e.g.,

$$\left. \begin{array}{l} \text{add to:} \quad\quad -100 \\ \text{multiply to:} \quad +2\,491 \end{array} \right\} - 47,\ -53$$

$$\Rightarrow \quad 2(x - 47)(x - 53) = 0$$
$$\Rightarrow \quad x - 47 = 0 \text{ or } x - 53 = 0$$
$$\Rightarrow \quad x = 47 \text{ or } x = 53.$$

Finally, we know that the area of the yellow square is greater than the area of the green square and, hence,

$$\underline{\underline{x = 53}}.$$