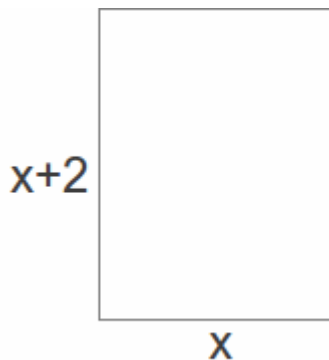


More Problem Solving

More advanced problem solving questions involve simultaneous equations or quadratics.

Example: The height of a rectangle is 2 cm longer than the base. If the area is 48 cm² find the length of the base.

If the base is x , the height is $x+2$.



The area is $x(x+2)$ and equating this to 48 gives $x(x+2)=48$. Expanding the brackets and subtracting 48 gives $x^2+2x-48=0$

We can factorise this expression to give $(x+8)(x-6)=0$. Equating each factor to 0 gives

$$x+8=0 \rightarrow x=-8$$

$$x-6=0 \rightarrow x=6$$

We cannot have a negative length so $x \neq -8$. This leaves $x=6 \text{ cm}$.

Example: Two pens and three pencils cost 57 pence. 1 pen and four pencils cost 51 pence. Find the cost of a pen and the cost of a pencil.

Let x be the cost of a pen and y be the cost of a pencil. The first sentence gives

$$2x+3y=57 \quad (1)$$

The second sentence gives

$$x+4y=51 \quad (2)$$

$$(1)-2 \times (2)$$

$$-5y=-45 \rightarrow y=9 \text{ pence}$$

Substitute into (2)

$$x + 4 * 9 = 51 \rightarrow x = 51 - 4 * 9 = 15 \text{ pence}$$