

Algebra with Geometry - Method



Key idea



Two skills, not a new geometry fact:

1. write an equation from a geometry fact you know, then
2. solve it.

Angle and perimeter facts give a **linear** equation; area facts give a **quadratic**.

Two-step method



1. Write the geometric fact as an equation in the unknown.
2. Solve it, then check it makes sense: a length must be positive, an angle between 0° and 360° .



= copy this into your book. Boxes without a pencil are just to read.

Linear: Angle and Perimeter Facts



Angle on a straight line

Angles $(x + 20)^\circ$ and 70° sit on a straight line.

$$(x + 20) + 70 = 180$$

$$x + 90 = 180$$

$$x = 90$$

Rectangle perimeter

Length 6 cm, width x cm, perimeter 22 cm.

$$2(6 + x) = 22$$

$$6 + x = 11$$

$$x = 5$$

Common mistake

Pick the right angle fact first. Vertically opposite angles are **equal**; co-interior angles **sum to** 180° . The wrong fact gives the wrong equation.



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Quadratic: Area Facts



Rectangle area



Width x cm, length $(x + 4)$ cm,
area 60 cm^2 .

$$x(x + 4) = 60$$

$$x^2 + 4x - 60 = 0$$

$$(x + 10)(x - 6) = 0$$

$$x = 6 \text{ or } x = -10$$

Key idea



An area quadratic has two roots
but only one sensible answer.

Reject $x = -10$ — a length can-
not be negative — so $x = 6$.

Common mistake

Do not report both roots.

Reject the negative (or zero)
length. On an angle question,
check the final angle is positive
and under 360° .