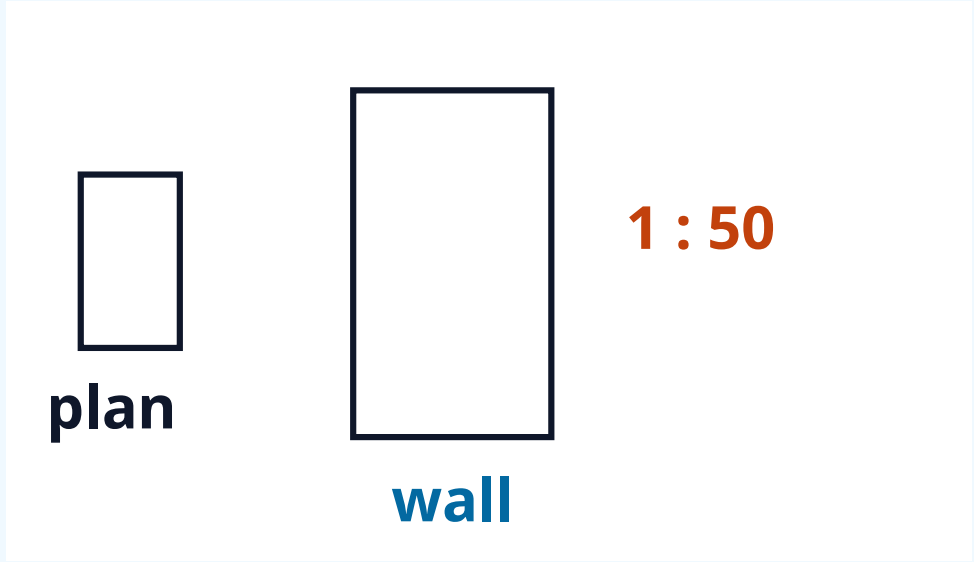
Mathematics 10-3

Unit G: Geometry and trigonometry

Similar polygons and scale drawings

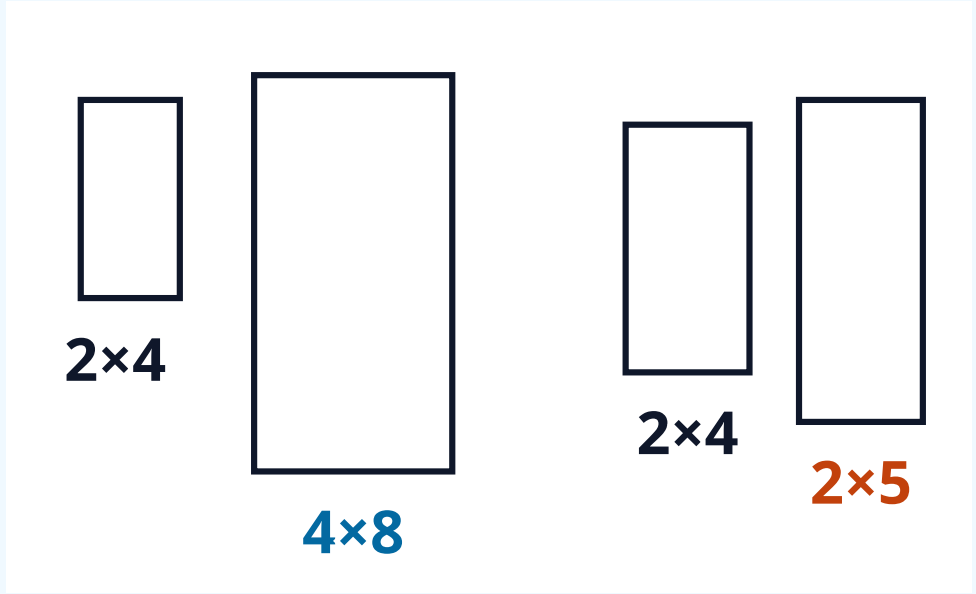
A wall on a site plan

- A site plan uses the scale 1 to 50.
- A wall that is 8.0 metres on the ground is 16 centimetres on the paper.
- The paper shape and the real wall share the same angles.
- Every real length is 50 times the paper length.



Angles match and sides stay in ratio

- Similar polygons have equal matching angles and one constant ratio between matching sides.
- A 2 by 4 rectangle and a 4 by 8 rectangle share right angles, and each side of the larger one is double.
- A 2 by 4 rectangle and a 2 by 5 rectangle share right angles, while the side ratios are 1 and 2.5.
- The similarity test fails.



Key terms

similar polygons

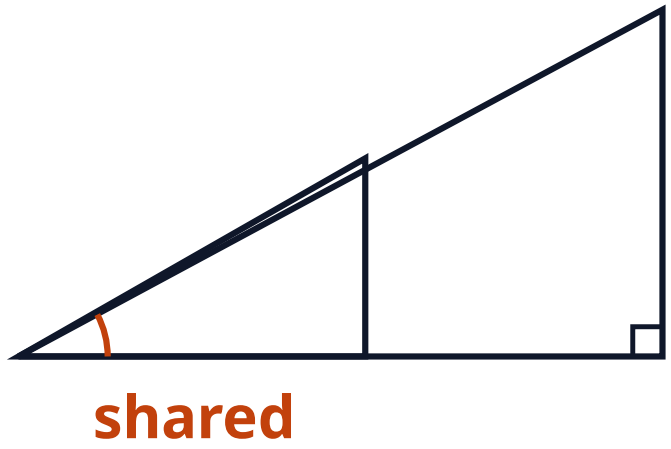
Polygons whose matching angles are equal and whose matching sides stay in one constant ratio.

scale factor

The number you multiply every side by when you draw a larger or smaller copy with the same angles. (1:50)

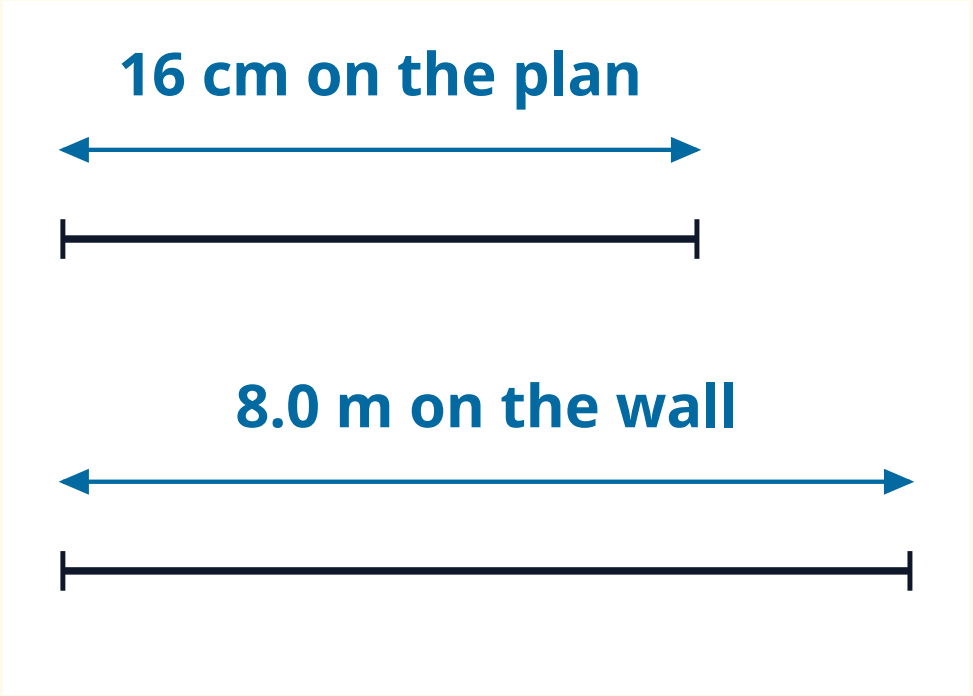
Triangles that share an acute angle

- Two right triangles that share an acute angle also share the right angle, so the third angles match too.
- Matching angles on a triangle force the sides into one ratio.
- A 3-4-5 triangle and a 9-12-15 triangle have ratio 3.
- On a polygon with more than three sides, matching angles still need a side-ratio check.
- Rectangles show why.



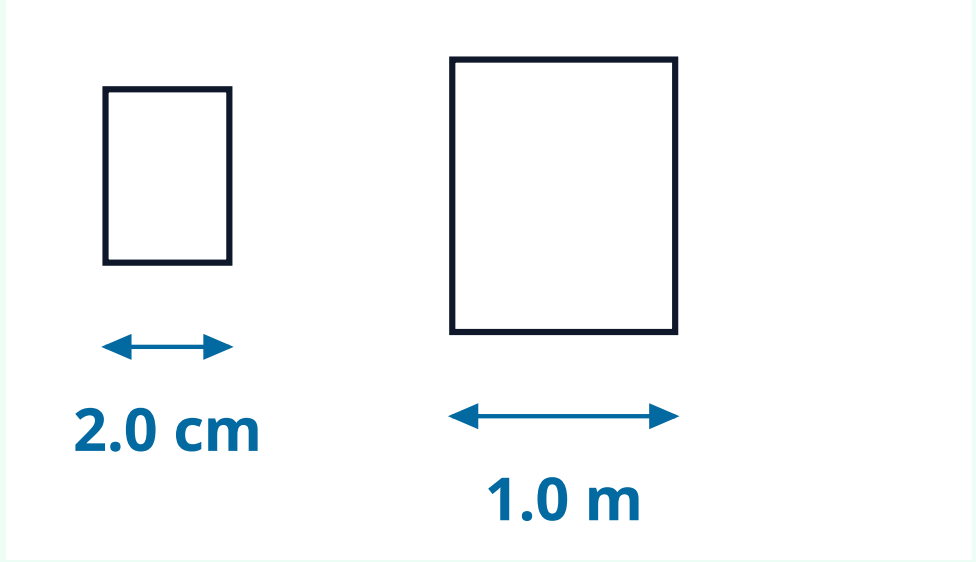
Wall length from a plan

- The scale 1 to 50 means 1 centimetre on the plan stands for 50 centimetres on the ground.
- The wall is 8.0 metres, which is 800 centimetres.
- Dividing 800 by 50 gives 16, so the wall is 16 centimetres on the plan.



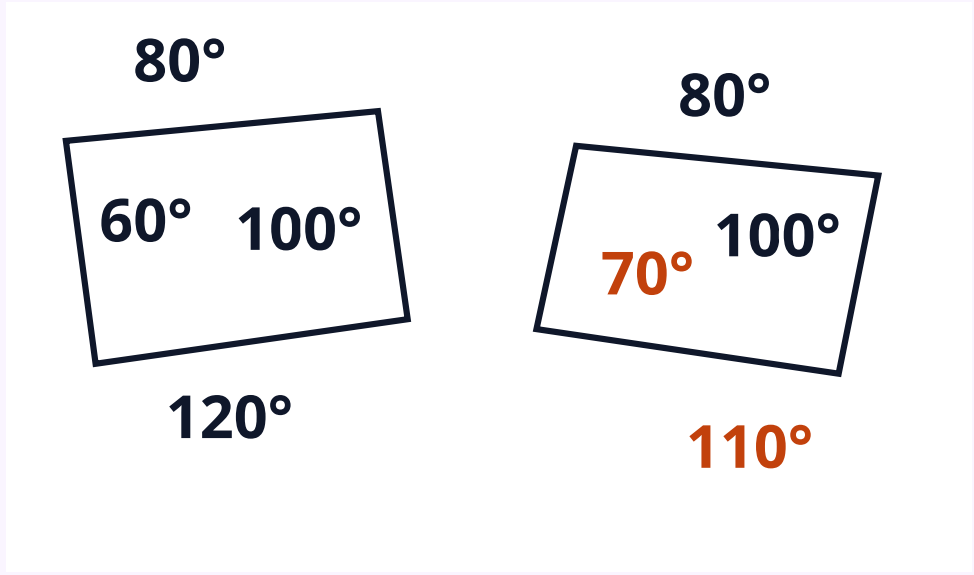
A window on the same plan

- A window measures 2.0 centimetres on the 1 to 50 plan.
- Multiply 2.0 by 50 to get 100 centimetres on the ground.
- That 100 centimetres is 1.0 metre, so the real window is 1.0 metre wide.



A quadrilateral angle check

- One quadrilateral has angles 80, 100, 120, and 60 degrees.
- A second has angles 80, 100, 110, and 70 degrees.
- The 120 degree angle has no match in the second polygon, so the angle test already fails.



Similarity check

- Explain why the 2 by 4 rectangle and the 4 by 8 rectangle pass the side-ratio test.
- Explain why the 2 by 5 rectangle fails against the 2 by 4.
- Find the plan length of an 8.0 metre wall at a scale of 1 to 50.

