



Similarity and dilations

Same shape, any size

- Today: similar means you may enlarge as well as move.

One definition, one extra move

- Congruent: slides, flips, turns.
- Similar: slides, flips, turns AND dilations.

Congruent is the special case where the scale factor is 1.

The test: RATIOS

- Pair up corresponding sides. Divide.
- All ratios equal $\Rightarrow$ similar.

One number, called the scale factor, for every pair of sides.

3-4-5 and 6-8-10

- $6 \div 3 = 2$. $8 \div 4 = 2$. $10 \div 5 = 2$.
- Three equal ratios. Similar.

Now 3-4-5 and 6-7-8

- Differences: +3, +3, +3. Looks perfect.
- Ratios: 2, 1.75, 1.6. Not equal.

NOT similar — and the differences said it was.

Why differences cannot work

- Enlarging multiplies. A big side gains more than a small one.
- 3-4-5 doubled gains 3, then 4, then 5 — UNEqual differences.

Equal differences is a translation's fingerprint, not an enlargement's.

Match the sides first

- Order both sets: smallest to largest.
- Then pair. $10 \div 3$ compares nothing.

Your turn

- Is 3-4-5 similar to 6-7-8? Show ratios AND differences.
- Then 3-4-5 and 9-12-15.

Which test told you the truth?