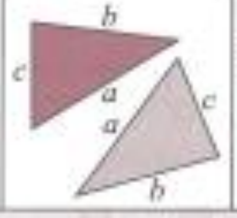
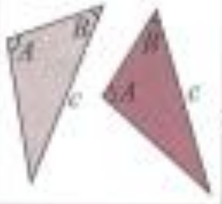
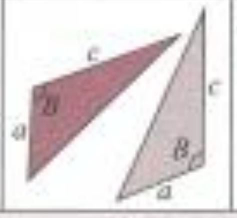
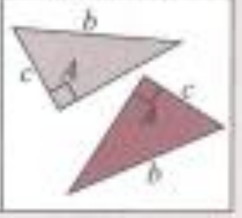
Congruent and Similar Shapes

Four Conditions for Congruent Triangles

Shapes are congruent under translation, rotation and reflection.

CONGRUENT — same size and same shape.

Condition	① SSS	② ASA	③ SAS	④ RHS
Description	three sides the same	two angles and corresponding side match up	two sides and angle between them match up	right angle, hypotenuse and another side all match up
Diagrams				

Two Steps to Prove Congruence

① Write down everything you know.

② State which condition holds and why.

EXAMPLE

O is the centre of this circle. Prove that triangles ABO and CDO are congruent.

① AO, BO, CO and DO are all radii, so they're equal.
Angles AOB and COD are vertically opposite, so they're equal.

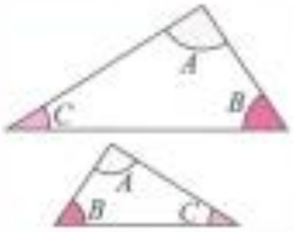
② SAS — two sides and the angle between them match up, so ABO and CDO are congruent.

Three Conditions for Similar Triangles

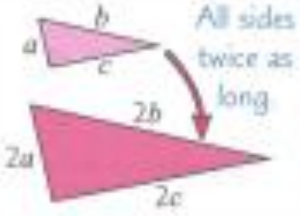
Shapes are similar under enlargement.

SIMILAR — same shape, different size.

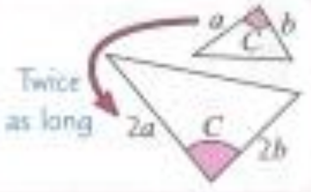
① All angles match up.



② All sides are proportional.



③ Two sides proportional and angle between is the same.

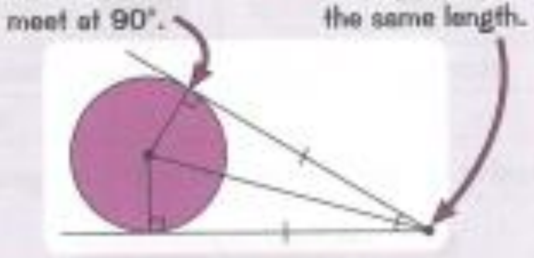


Circle Geometry

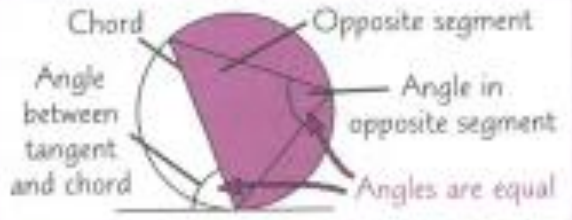
Three Rules with Tangents

① A tangent and a radius meet at 90°.

② Tangents from the same point are the same length.



③ **ALTERNATE SEGMENT THEOREM**
The angle between a tangent and a chord is equal to the angle in the opposite segment.



Two Rules with Polygons

① Two radii form an isosceles triangle.

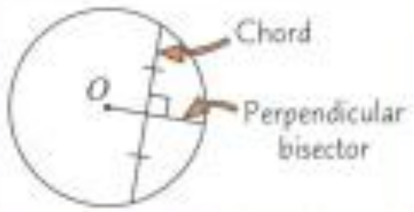
The radii are always the same length.

② Opposite angles in a cyclic quadrilateral add up to 180°.

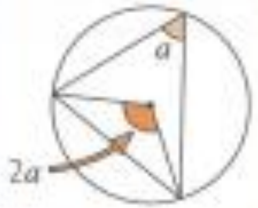
$a + c = 180°$
$b + d = 180°$

Four More Rules

① The perpendicular bisector of a chord passes through the centre.



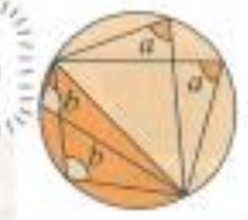
② Angle made at the centre is twice the angle made at the circumference.



③ Angle in a semicircle is 90°.

④ Angles in the same segment are equal.

Two angles in opposite segments add up to 180°.



$a + b = 180°$